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OCTOBER 1993

Macworld

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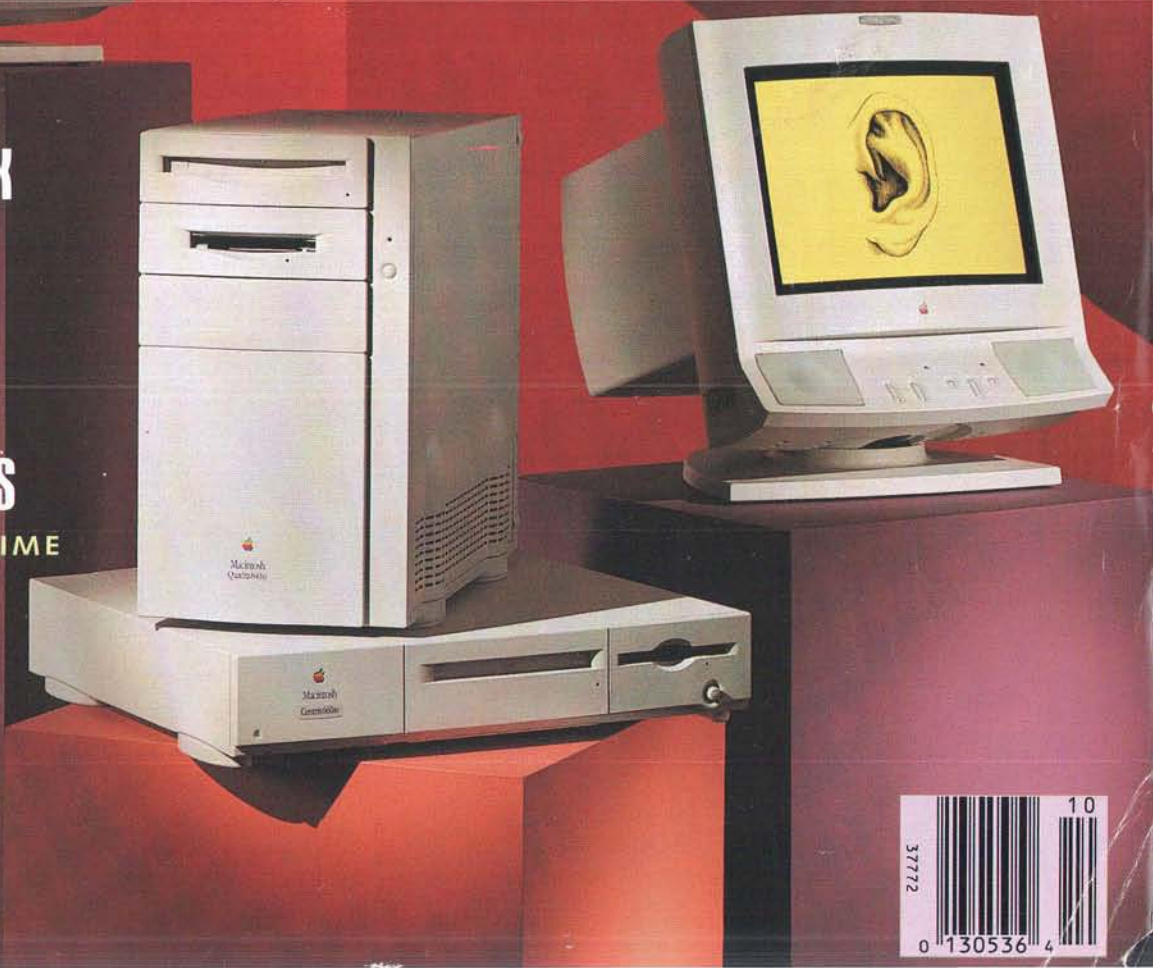

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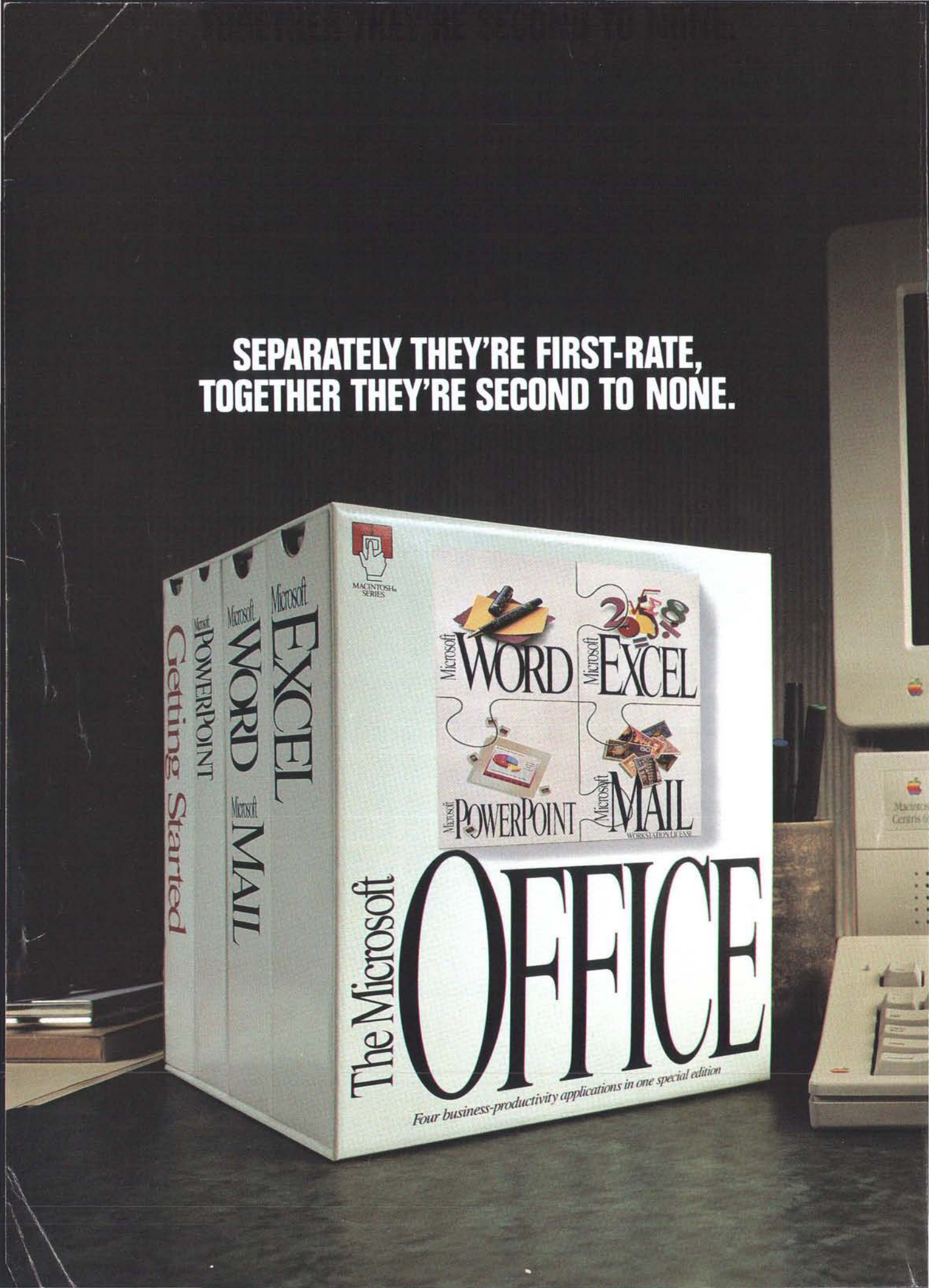

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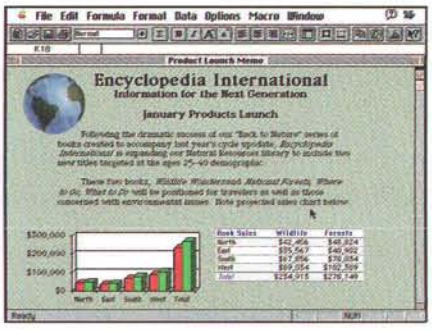

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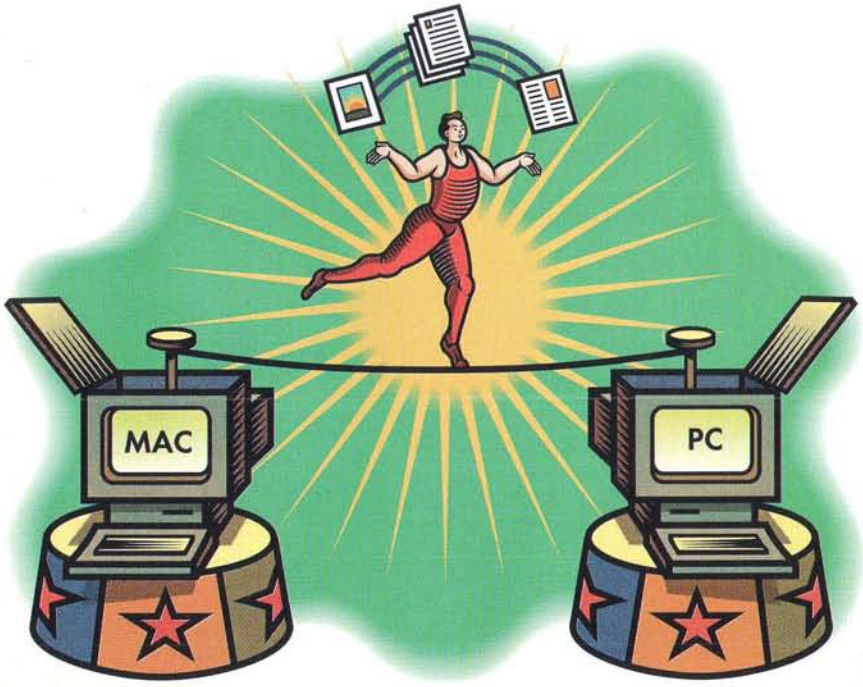

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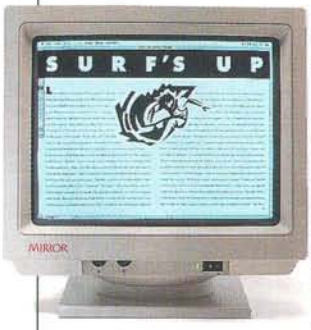

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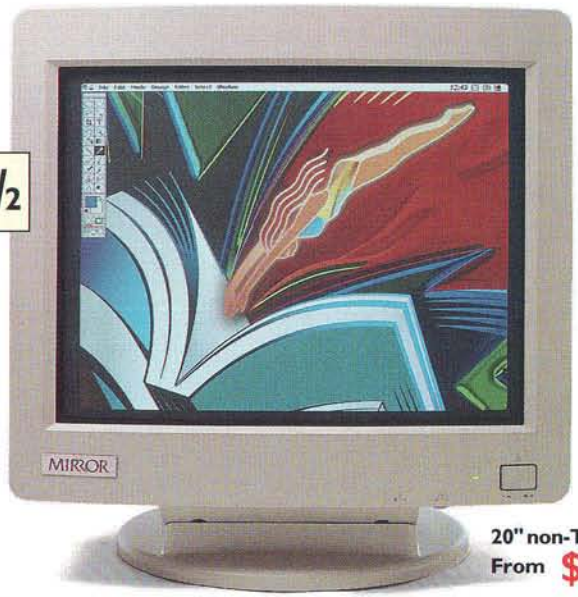

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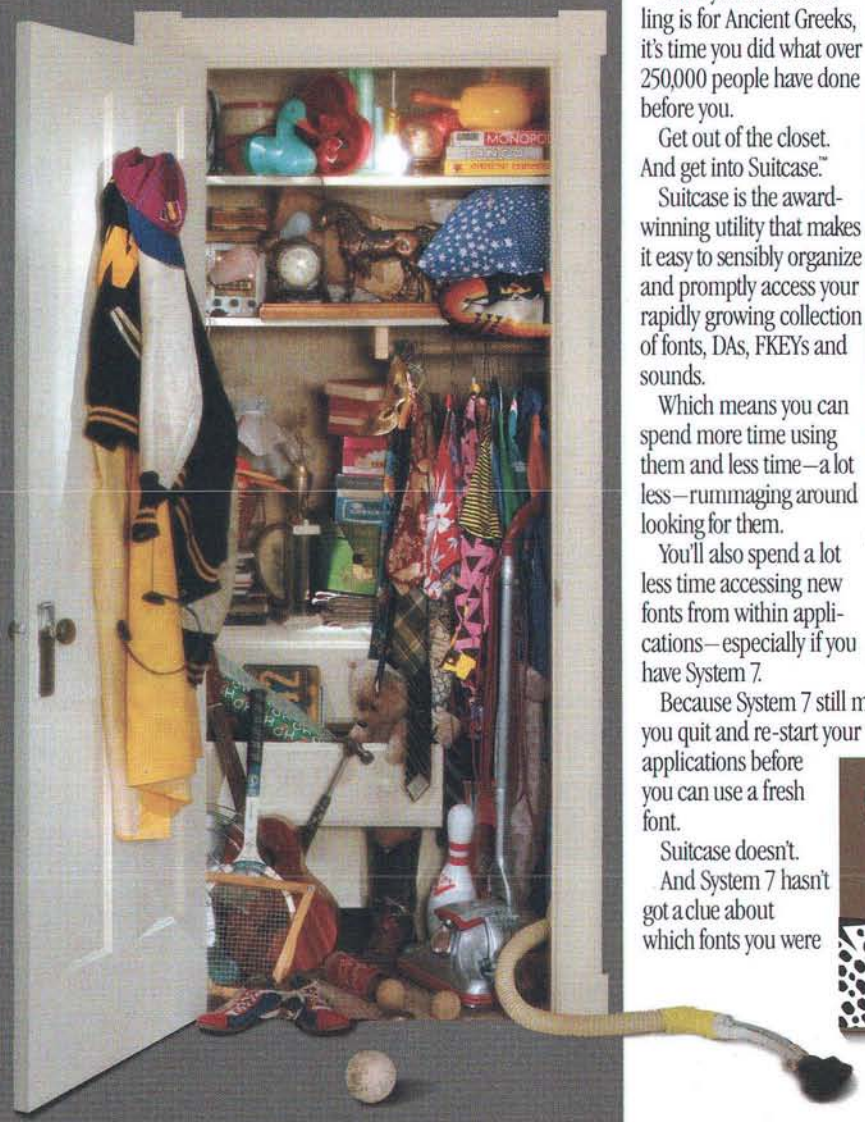

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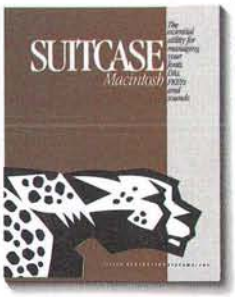

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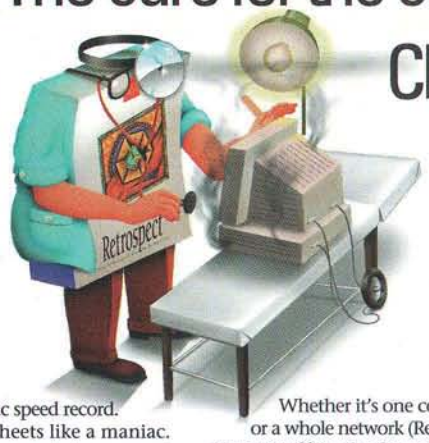

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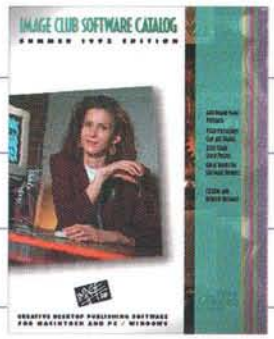

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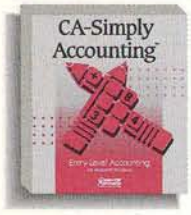

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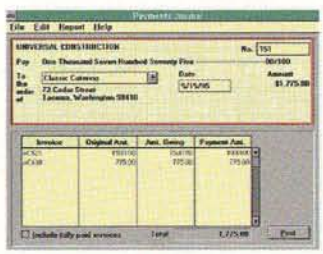

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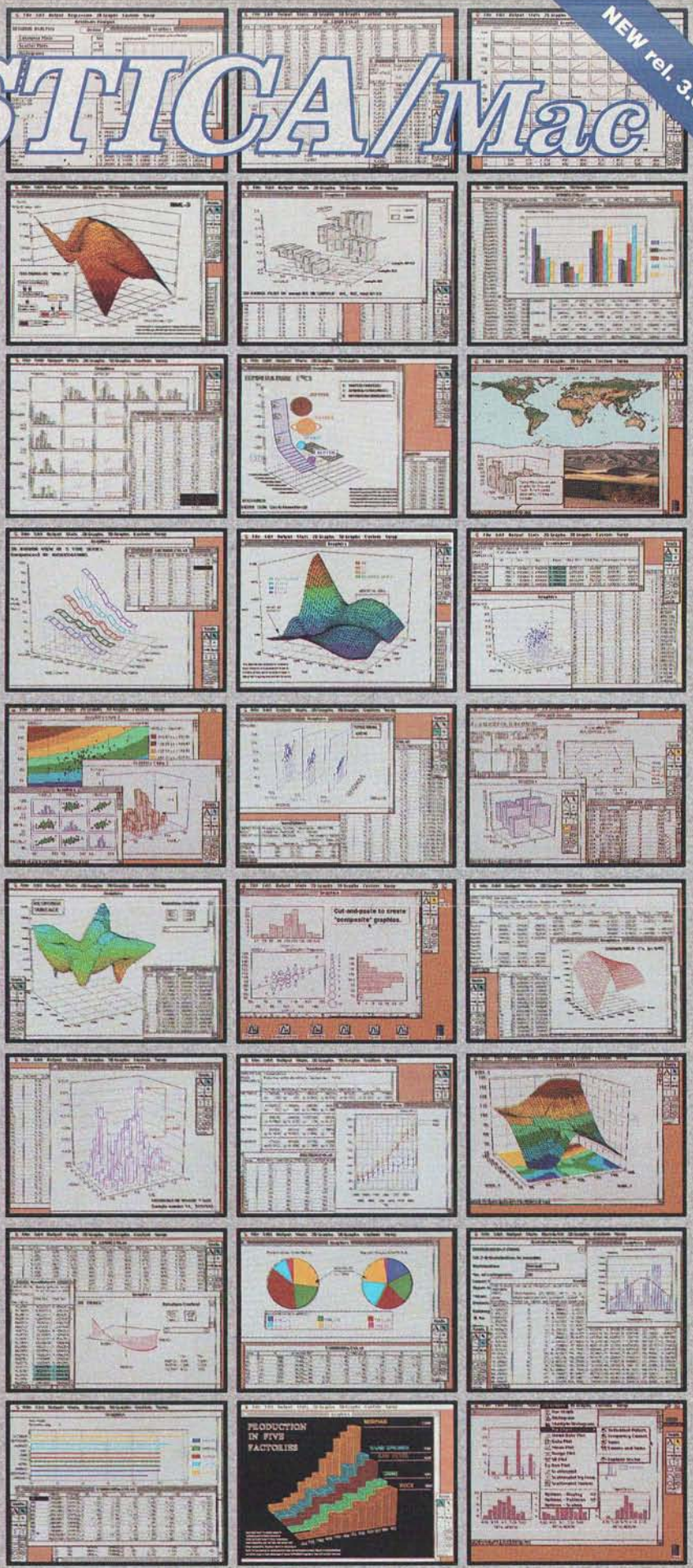

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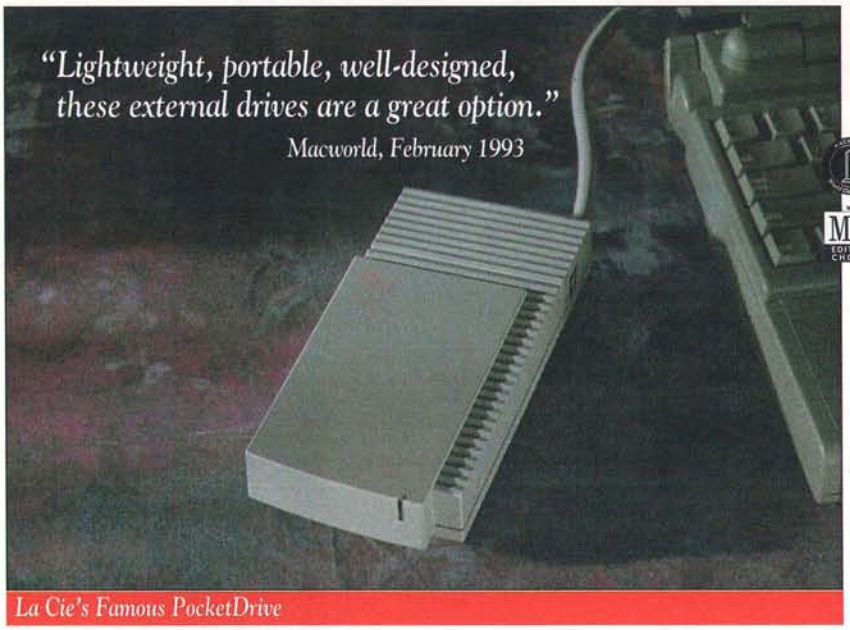

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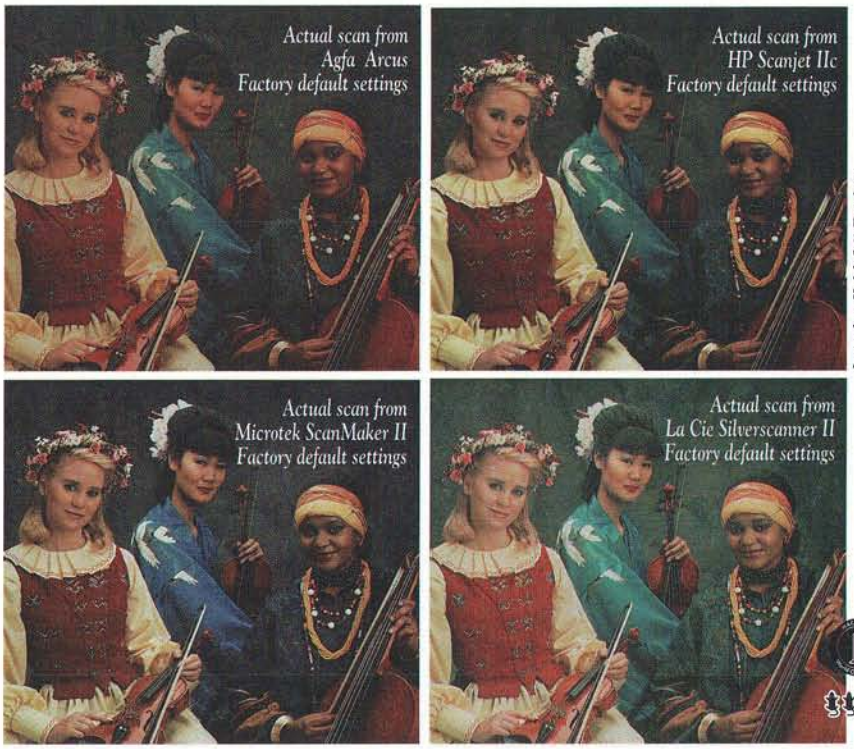

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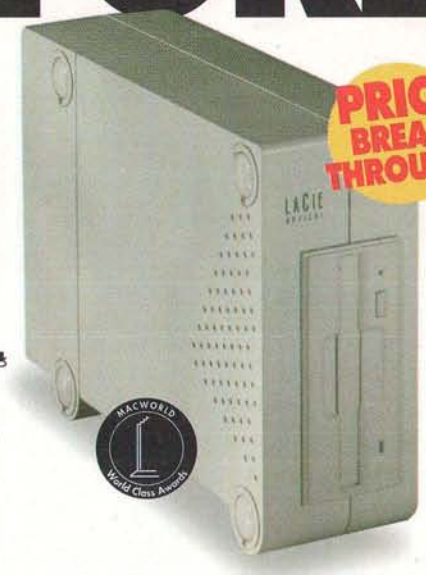

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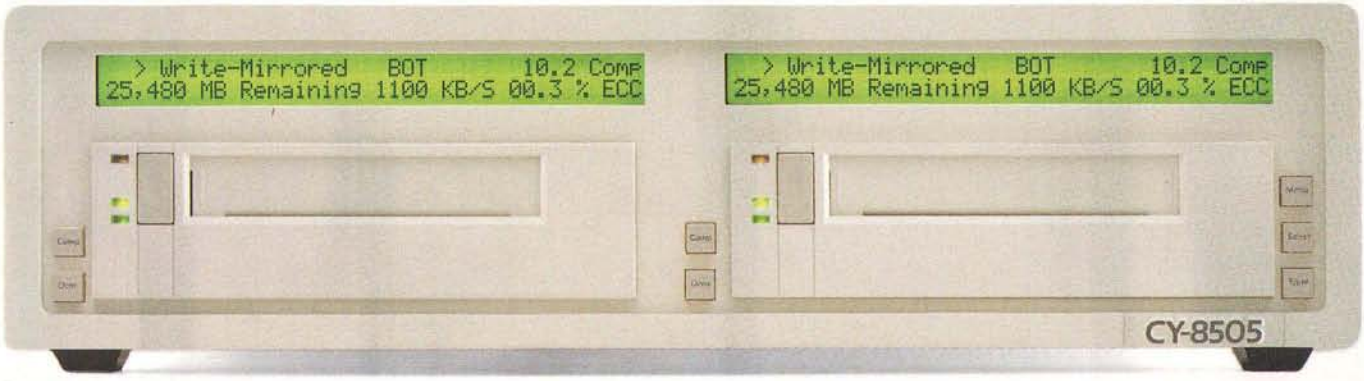

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BY ADRIAN MELLO

Securing Apple's Future

Refocusing on the present

EVENTS OF THE LAST FEW months have left people wondering about Apple's future. In late spring, Apple announced that it would not meet its financial goals for the quarter. Shortly thereafter, Apple's board replaced John Sculley as CEO, and rumors abounded that he would not return to Apple when his sabbatical was over at the end of this summer. Within a month Apple announced that it would lay off 2500 employees, about 15 percent of its work force (for more details on these events see *MacBulletin*, *Macworld*, September 1993, and *News*, this issue.) Based on these events some people are overreacting, predicting Apple's eventual demise. Recent difficulties should not obscure the generally good decisions Apple has made over the last few years. The company has done a remarkable job of adjusting to the market by becoming more price-competitive and customer-driven. The recent introduction of the LC 520 demonstrates just how price-competitive Apple can be.

The reasons for Apple's current difficulties are straightforward. As Apple has continued to drop its prices—under the pressures of the personal computer price wars—profit margins have dropped as well. Apple could no longer support its traditional high overhead and was forced to reduce costs. The layoffs and restructuring are necessary first steps in assuring the company's financial health.

Even so, Apple needs to chart a sure course out of the rough waters it finds itself in today. Its biggest threat is the swelling sales of Microsoft Windows. The installed base of Windows PCs is more than twice the size of the Mac's installed base. According to recent figures from the Software Publishers Association, the sales of Windows applications are several times greater than Mac software sales.

Apple must be careful not to run aground as it strives to meet this challenge. But its craft is sound, and with a good plan of navigation and a few course corrections it can be in better shape than ever. In this issue I'll cover what Apple needs to do first, and I'll finish up next month with a discussion of Apple's real competition—Microsoft.

Right now Apple needs to focus its efforts on the Macintosh, cut back its overgrown product line to reduce costs (and therefore prices), and work like mad to finish its PowerPC Macs (due sometime in the first half of 1994).

Refocus on Computer Business

First, Apple has to refocus on its core business—the business of selling desktop computers. Apple has been distracted by a fascinating vision of the future where the worlds of telephony, computers, and consumer electronics all merge. Apple is laying the groundwork for that future with technologies such as voice recognition, products like the Newton and the AV Macs, and with the development of new services like Apple's upcoming online information service.

Planning for a future convergence of these technologies is quite sensible, but the question is, How fast will all these different technologies start to converge, and when will they reach critical mass? We'll know it's happened when Apple can make enough money from that market to run the company. It probably won't happen until the turn of the century in numbers significant enough to warrant a complete shift of Apple's business model. To be honest, I think it will take longer, but I'm hedging my bet because so many bright people I respect think it will all fall into place in a few years.

In the meantime, Apple will have to keep slugging it out with the likes of Microsoft, Compaq, Dell, and all the other furies of the Windows universe. These titans have fought a long, brutal battle for market share that just gets tougher all the time. Apple now finds itself uncomfortably peering into an abyss that a few other giants such as IBM, Compaq, and Dell have teetered on the edge of in astonishment in the last few years.

Fewer, Better Models

For quite a while Apple has been creating too many new models that overlap each other in their price/performance. The combination of price cutting and the plethora of new systems has confused everyone who is trying to figure out what the best model is for a particular use. Many Mac buyers suddenly became gunshy after the debacle of the IIvx, which within a few months of its introduction dropped in price by 35 percent and appeared to be superseded by the Centris machines. No one wants to buy a product that may be outdated only a few months after it debuts.

Furthermore, Apple has had difficulty meeting the manufacturing demands of its much more complex product-range, and consequently the company stifled the initial demand for some of its newer offerings. Apple's initial failure to ship its docking stations for the Duos is a case in point. Buyers are likely to get even more conservative when they face availability problems on top of price cuts and shortened life cycles.

One important step Apple is almost certain to make is simplifying its over-

continues

GLENN MITSUI/STUDIO MD

crowded model lineup. There are too many Performas, PowerBooks, and other Mac models. The product lines are clear enough, but we don't need more than three or four different Performas or PowerBooks. Apple should quietly drop the LC II and the Classic II. There is no reason for these models in light of the LC III and the Color Classic. And Apple should continue offering the Centris 610, the Centris 650, and the Quadra 800 to businesses.

Apple would realize tremendous cost savings from developing fewer, more carefully considered models. There must be better uses for very expensive engineering teams than working on some of the minor revs we've seen from Apple in the last year. Fewer models would also mean less strain on manufacturing capacity.

While Apple must continue to offer the most compelling deals possible on desktop models, at the same time it must keep providing leading technology and packaging. I don't mean that Apple should include quantum-leap-forward technologies such as voice recognition and video, but that it should simply integrate more features for the money.

When the PowerBooks were first introduced, they were a terrific example of this approach. They took an existing notebook type of product and combined the superior Macintosh operating environment with leading power-conservation technology and the choice of a high-quality screen (on the PowerBook 170). But design compromises evident in the 180c and the 165c have since eroded the PowerBook's leadership position. Future PowerBooks need to offer excellent screens and good battery technology at a competitive price, and Macs in general need to continue to gain new, integrated features if they are to stay above the rising tide of Windows machines.

Smooth the Way for PowerPC

Third, and most important, Apple must concentrate on making a successful transition to PowerPC. The PowerPC chip is Apple's future for at least the next few years and probably well beyond. The first thing Apple has to do is make its customers understand that, where Apple is concerned, PowerPC *is* the Macintosh. It's amazing how many people think that PowerPC is an entirely different platform. The hardware is different: PowerPC is a family of RISC microprocessors designed by IBM with Apple and Motorola and publicly adopted by Apple as the basis for development of future Macintosh systems. Although the PowerPC chip family is a departure from the Motorola 680X0 processor series, the most important part of a computer is the operating environment, and PowerPC-based Macs will run a version of System 7. Major portions of System 7 will be rewritten to optimize the performance of the operating system for the PowerPC hardware.

Think of PowerPC as a Mac cyborg. ("I'll be *Mac!*") It will have the outward personality and character of a Mac. It will still use the same software as a Mac. But underneath the familiar exterior will be a powerful machine that augments the Mac's native abilities.

Most existing Mac software applications should be able to run on PowerPC-based Macs. They should run at about the same speed as they do today on comparable Mac models. PowerPC will provide compatibility for existing applications but no real performance improvement at first. Apple is likely to provide some interim performance improvements by making incremental changes to the initial PowerPC Mac operating system, but the great-

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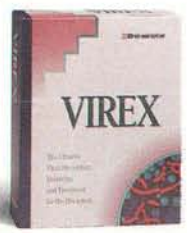

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est performance gains will come when users upgrade to applications rewritten to run in PowerPC's native mode. In this case, performance increases will be stellar; a native PowerPC application should run at least twice as fast as the same program written for current-day Macs.

So, What Are the Odds?

Usually, when a major hardware transition is coming up, software developers complain about all the new hardware's weaknesses and the burden of problems they confront in making the transition. However, I've talked to a number of developers who are deep into converting their software for PowerPC, and I have heard only glowing remarks. This is highly unusual and bodes well for users, Apple, and the Macintosh development community.

Now Apple has to make certain that potential buyers of PowerPC-based Macs understand that they will have a smooth transition. Apple has already announced that it will provide upgrade system boards for a number of existing Mac models, including the Centris machines and the Quadra 800. Apple must also make sure that people understand that PowerPC will still run existing applications, as well as offer a significant performance boost to newer applications.

A Revitalized Apple

In the short term there are dark times ahead for Apple because it has been introducing too many models and focusing too much on glamour products and technologies—such as Newton and voice recognition—that have no proven demand. But Apple is still a strong company with a good chance to survive and prosper. Just look at Compaq if you want an example of a company that was having a difficult time adjusting to sliding profit margins due to price cuts. Compaq changed its strategy and began offering the low-cost ProLinea line. Compaq recently announced profits that were more than triple those of the same quarter the previous year. Compaq is now outstripping both Apple and IBM as the sales leader among personal computer vendors.

With the low-cost Macs, which followed increasingly expensive models, and with the PowerBooks, which followed the clunky Portable, Apple has shown many times that it can successfully and quickly change course. By refocusing on its core business, offering fewer products with better value, and handling a successful transition to PowerPC, Apple should emerge from its difficulties. Longer term, Apple must challenge Windows for market share. Next month, I'll expand on the plan to deal with that. m

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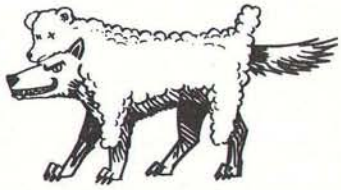

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Raven-800 Upgrade Kits:		Suggested Retail
Q8RUi-1030R - 1030 MB	Internal Quadra 800 upgrade kit includes one 500 MB drive, data and power cables, Raven Software utility, and a MicroNet NuPORT-III SCSI card. Improves data transfer rate from 2.2 MB/sec to 5.6 MB/sec.	$ 1,695
Q8RUi-2024R - 2024 MB	Internal Quadra 800 upgrade kit includes one 1000 MB drive, data and power cables, Raven Software utility, and a MicroNet NuPORT-III SCSI card. Improves data transfer rate from 2.2 MB/sec to 6.2 MB/sec.	2,095
Raven-040 Upgrade Kits:		
Q9RUi-1030R - 1030 MB	Internal Quadra 950 upgrade kit includes one 500 MB drive, data and power cables, and our Raven Software. Improves data transfer rate from 2.2 MB/sec to 5.6 MB/sec. Leaves all five NuBus slots open.	$ 1,395
Q9RUi-2024R - 2024 MB	Internal Quadra 950 upgrade kit includes one 1000 MB drive, data and power cables, and our Raven Software. Improves data transfer rate from 2.2 MB/sec to 6.2 MB/sec. Leaves all five NuBus slots open.	1,795

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OCTOBER 1993

Letters

The Public on Privacy

BRAVO! STEVEN LEVY'S IMPASsioned defense of privacy in the July issue was welcome, indeed *(The Iconoclast)*. Keep up the good work, and hats off to Mr. Levy.

Peter Saint-Andre
via MCI Mail

STEVEN LEVY'S ARTICLE IN THE July 1993 *Macworld* is extremely alarming. I accept the appropriate use of wiretaps by the FBI but I'm less than happy to have a hookup point built into my phone line, and far less happy to have to pay for it.

I like to think that I have nothing to hide, and thus nothing to fear, but all manner of officials (FBI, IRS, Department of Justice, ATF, Secret Service) could conceivably think otherwise. If any of them wish to monitor my phone calls or modem communications, my knee-jerk reaction is "Drive on, fellas." But how big a stride is it for the same officials to require me to pay for duplicates of my front door keys, so that any of the above-mentioned agencies could enter my home in my absence and without my knowledge? Orwell's 1984 is knocking at our door right now.

Francis Heaton
Everett, Washington

More Troubleshooting Tips

DEBORAH BRANSCUM OFFERS SOME sound advice for immediate action in the event of a troubled Mac (*Conspicuous Consumer*, July 1993).

One piece of advice that she offered was to rebuild the Desktop file, to which she added that "any comments entered in the Get Info dialogs of your apps will be lost in the process." Fortunately, this is not necessarily true. The trick is to use the free extension CommentKeeper 1.0 (by Maurice Volaski), which will

automatically save and reenter all Get Info comments when you rebuild the Desktop.

John Thoo
via Internet

I WANTED TO ADD TO DEBORAH Branscum's very interesting and informative column in the July issue. When you mentioned applications being corrupted and having to be trashed and replaced, you brought back not-so-fond memories! Before you reinstall the application, you may want to trash the preferences file first. More often than not, that file becomes corrupted and causes the trouble. I tell my club members to try that first and then, if they are still having problems, to reinstall the application. Usually, replacing the application will not replace the preferences file, and the problem will continue.

Bob Meyers
via AppleLink

Notes to preferences file hunters: many applications store their preferences files in the Preferences folder in the System Folder. Others use the System Folder itself, and some store the file in the application's own folder.—Ed.

Adjustable Points of View

I SHUDDER TO THINK WHAT THE people in Apple's peripherals department must have done or said to Ann Garrison to cause her to give such a lousy review to their very nice Adjustable Keyboard (*Reviews*, July 1993). Perhaps she never received her free mouse pad, or is she by chance the owner of a brand-new Mac IIvx?

She spent seven paragraphs discussing why keyboards are ergonomically incorrect and the ill effects they can inflict on typists, and just a single paragraph on the Keyboard itself. She then completely glossed over the information that users need to know—like the fact that the feel and response of the Adjustable Keyboard are noticeably better than on the Extended Keyboard. Or how convenient it would be for a left-handed person to position the numeric keypad on the left side of the keyboard. Or how people like me who don't often use the keypad or function keys could disconnect it and clear up some desk space.

Agreed, Apple's Adjustable Keyboard will not end muscle and wrist fatigue, and the nonstandard design of the function keys takes some getting used to, but the wrist rests and the split-keyboard layout do make typing more comfortable, and the layout flexibility and volume control do make the Adjustable Keyboard worthy of consideration over other traditional keyboards.

Nelson Haukap
Carroll, Iowa

IT SEEMS THAT THE INDUSTRY HAS accepted that an ergonomically perfect keyboard will solve the problem of wrist, shoulder, back, and neck injuries related to typing. I don't believe the ergonomically designed keyboard is the answer. I believe the Dvorak key layout is the most expedient way to put an end to typing-related discomfort. As a typist, it is obvious

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CORRECTIONS

- *In "Choosing a Storage Strategy" (August 1993), the Bernoulli MultiDisk 150 should have been described as capable only of reading 44MB Bernoulli cartridges, not writing to them.*
- *The correct price for StrataType 3d is $199, not $295 as listed in the sidebar "Easing the 2-D–to–3-D Transition" in "Depth-Defying Design" (August 1993).*
- *In the "SCSI Adapter Performance" chart in "Supersonic Storage" (August 1993), the MicroNet 1240NP was incorrectly identified as the MicroNet SS-414NP. Also, in "Hard Drive Speed Tests," the MicroNet SS-1240NP was incorrectly designated the MicroNet SS-1240.*
- *In the table "Macros Spoken Here"* (Getting Started, *August 1993), WordPerfect should have been shown to include all the macro features listed.*
- *In September's* Streetwise Shopper, *the phone number for MECA Software (Managing Your Money 5.0) should have been 800/288-6322.*

to me that the Dvorak key layout causes less fatigue because it dramatically reduces the overall distance fingers travel.

I'm not sure exactly why I'm writing this letter. I suppose I hope that people will convert to the Dvorak key layout and live happily ever after.

Matt Gaylen
Midnight Express Typing Service
Gunnison, Colorado

Quips, Notes, Random Advice

WE ARE STILL NOT OUT OF THE forest when it comes to many people's understanding of computers. I was working with my PowerBook while reading information from a CD-ROM station at a small local public library when the librarian came over and told me that I couldn't use my computer because the CD-ROM was copyright protected.

After further discussion (during which the librarian became visibly agitated), I realized that she thought I was somehow accessing the library's CD through my PowerBook and copying the database! I explained how I was using the computer as an electronic notebook, she apologized, and I was allowed to return to my work.

Here was a person in the business of managing information who still views computers and those who use them with suspicion and misunderstanding.

Craig Wandke
Monterey, California

Be gentle, Craig—there are still a lot more of them than there are of us.—Ed.

I WOULD LIKE TO SEE MORE REVIEWS of really bad products. Bad reviews perform a valuable service by warning us about poor products in our midst.

Additionally, a bad review helps to point out exactly what the state of the art is in Macintosh computing; what will and will not be tolerated in terms of functionality, interface design, and technical support. Besides, the *really* bad ones are entertaining.

Joseph Ashear
via America Online

Attaboy, Joseph! That's what we here at *Macworld* like to see—sheer, naked, glorious blood-lust. Given the American public's penchant for high body counts, maybe we should start a new section of one-star reviews. We could call it "Totally Recalled." —Editor-in-Cheek

I AM WRITING TO EXPRESS MY AGREEment with Charles Seiter's review of FutureBASIC in the July issue of *Macworld*. I have been a Macintosh software developer for the past five years and have been using FutureBASIC since its introduction. It is perfectly capable of producing polished, professional software that runs as quickly and smoothly as software developed in other languages.

Jonathan Durkee
Sacramento, California

New Mac City

I AGREE WITH GARY KRATZER'S CONclusion that the LC III is a superb deal (*Reviews*, July 1993). I wonder, however, why *Macworld* has consistently given such lukewarm press to the even more remarkable Centris 610.

In his May 1993 column, Adrian Mello writes that "most users who are looking for the additional performance the 610 provides will also want more expansion capability" (*State of the Mac*). In the June issue, Galen Gruman criticizes the 610 for its limited expansion-board space (*Reviews*).

I think these reviewers miss the point. The Centris 610 is all the Macintosh a typical word-processor-and-spreadsheet user like me wants, but unlike the LC III, it packs the punch of a 68040. I am unlikely to ever require a 24-bit color board or video-input card, but I do use Microsoft's corpulent Word 5.1, and I do not like to wait.

Scott Jeynes
Cincinnati, Ohio

continues

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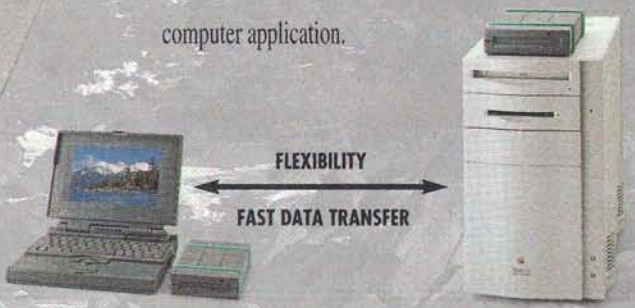

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ADRIAN MELLO WROTE IN THE July issue of the fate of the so-called obsolete Macintosh computers (*State of the Mac*). As a junior high school teacher of English and drama, let me assure you that, to an educator, there is no such animal as an extinct Macintosh.

If there are any of you high-tech readers out there who feel the need to update every time a new Mac comes out, here is a tip on how you can support education. Take that old Mac Classic, LC, IIvx, etc., to your favorite elementary, junior high, or senior high school. I assure you that that antique of yours will give many years of service to students and teachers. Personally, I'd give a passel of conjugated verbs and a gold-plated passage from the Bard in exchange for any kind of a Mac in my classroom—to say nothing of a Macintosh IIvx.

Kelly L. Johnson
Mesa, Arizona

I JUST FINISHED SKIMMING OVER your article "The Macintosh Book of the Dead" (*State of the Mac*, July 1993). My Classic II is not outmoded, wan, passé, or obsolete. It does what I need it to, plus more, and it fits in the corner of my room. I don't need a Color Classic, and to tell you the truth, the Color Classic is just plain ugly. Speaking of things that are dated, it's time for Mr. Mello to get a new haircut and glasses.

A Classic II Fan
Redondo Beach, California

DIANE FENSTER

Adrian Mello: Rebel. Outlaw. Surfer.—Ed.

Top Guy

I TRULY LAMENT *MACWORLD*'S INclusion of Guy Kawasaki in what is otherwise an excellent publication. I honestly never saw what was so funny about his columns, either here or in *MacUser*.

Comparing a Quadra with an F-15. What a hoot. Next, maybe we can compare a LaserWriter with Cheerios.

Randy Garbin
via America Online

YOU COLUMNISTS GET ALL THE fun. Not only do you get to use the latest and greatest hardware, but now you're tooling around Alaska in an F-15. Do your haircuts cost $200, too?

I have just one question—why did the article compare a Quadra 800 to an F-15 while the headline stated that you were comparing a Quadra 950? Did you pull one too many g's? By the way, for your next column I would like you to compare a Quadra 800 to a Tomahawk cruise missile.

Kevin Janke
Director of Research and Development
Tactical Weapons Division
Graymatter Graphic Design
Phoenix, Arizona

The headline of *Wise Guy* (July 1993) should have read "The F-15 vs. the Quadra 800." The error was made by the ground crew.—Ed.

Real Prices for Real People

IN THE JULY ISSUE OF *MACWORLD* you suggest adding a 256K VRAM SIMM as a cheap upgrade to the LC III (*Reviews*). While I completely agree with the advice, you say that the card should cost "about $100." This is silly. Most readers don't care about list price; they want to know how much it will take to get their hands on a product. In the future could you please mention it when there is a big difference in pricing?

James Davis
Davis, California

While you do have a point, James, *Macworld* will continue publishing the list prices of products we mention. Street pricing varies greatly, depending on which street you're on and when you're there. When we evaluate products, we take price into consideration, and using the list price provides a relatively level playing field. A list price is also a more stable (and therefore more useful) guide for readers searching for their own bargains. We often mention the street price of a product within the text of an article, and we'll continue this practice. In the case of the VRAM SIMM, the author quoted current street prices at the time the article was written.—Ed. m

Letters should be sent to *Letters, Macworld*, 501 Second St., San Francisco, CA 94107; via fax, 415/442-0766; or electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1), or via Internet (70370.702@compuserve.com). Include return address and daytime phone number. Due to the high volume of mail received, we can't respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld*.

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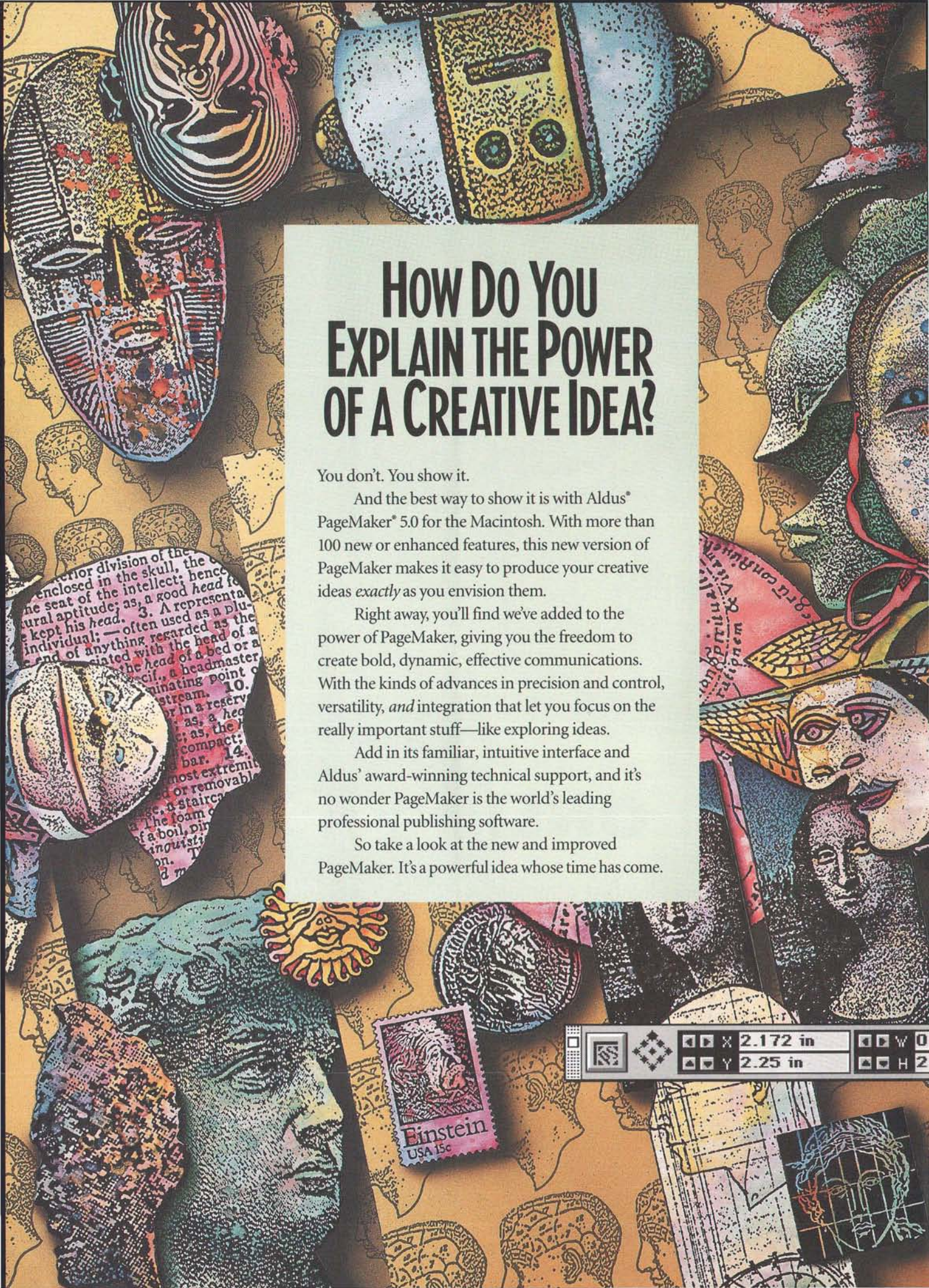
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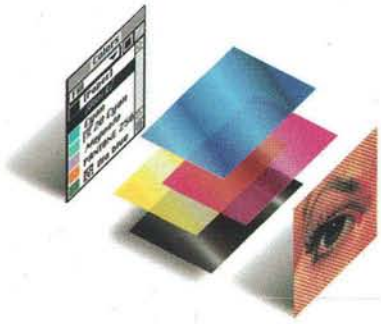

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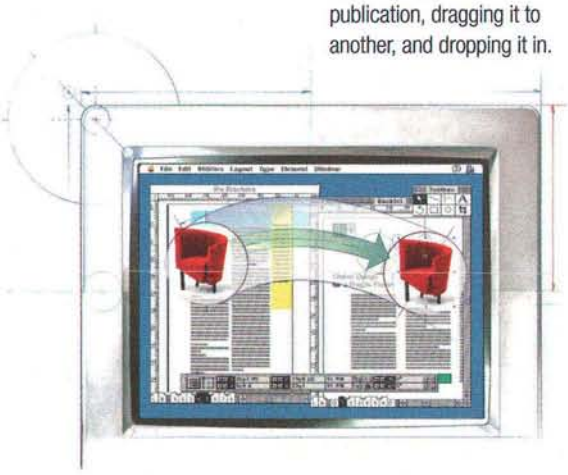

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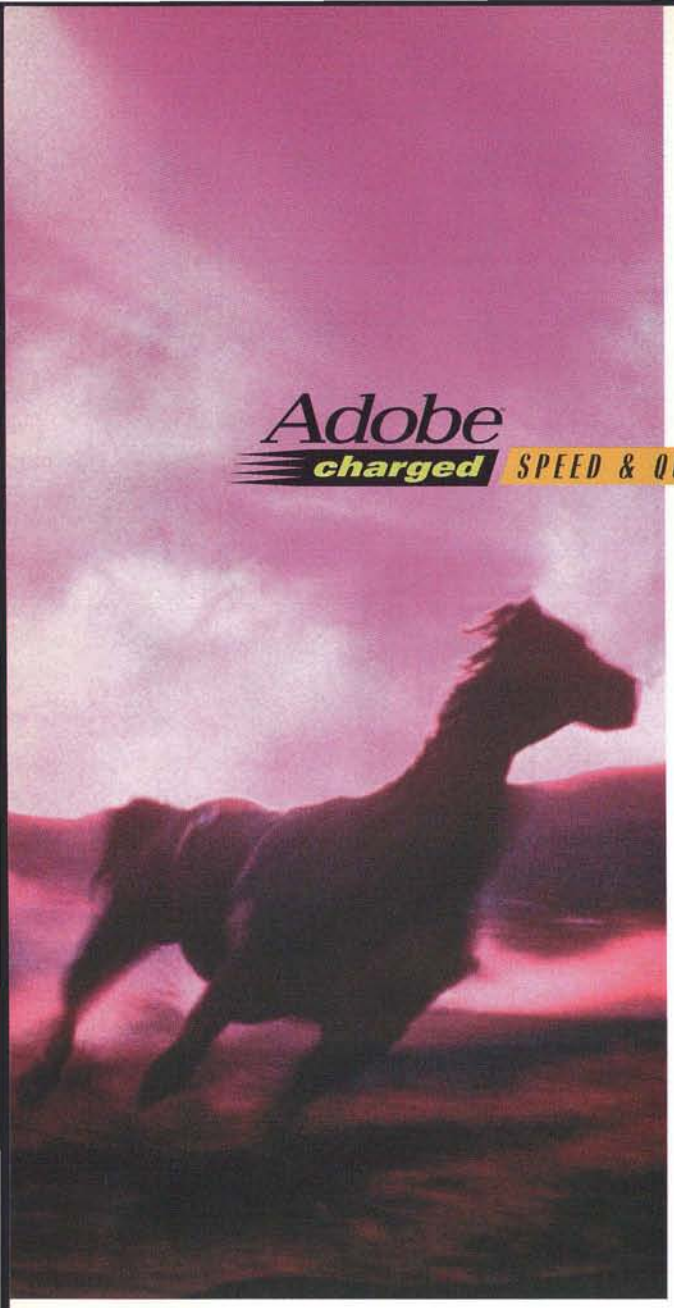

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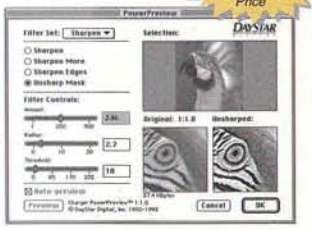

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LATE-BREAKING NEWS

MacBulletin

Still More Apple Price Cuts Spurred by increased supply, Apple has cut its prices for the third time in several months, slashing the tags of some of its most popular systems by up to 33 percent. PowerBook Duo prices fell by 18 to 25 percent, with the Duo 230 4/80 cut the most, to $1719. Centris 650s dropped by 27 to 33 percent, with the 8/80 model with 512K of VRAM, Ethernet, and an FPU dropping more than $1000, to $2139. Quadra 800 prices were reduced by 17 to 19 percent, with the 8/230 model down $910, to $3769, including 512K of VRAM, Ethernet, and an FPU.

ChipSoft MECA Buy-Out Nixed The Justice Department has blocked an announced acquisition of TaxCut publisher MECA Software (203/256-5000) by MacInTax publisher ChipSoft (619/453-4446). The two companies publish the only stand-alone tax-preparation packages on the Mac. ChipSoft, which dominates the tax market on the PC side, obtained MacInTax in an earlier acquisition and then stopped publishing the Mac version of its own TurboTax.

Radius Layoffs About 30 people, mostly operations staff, lost their jobs in a recent belt-tightening at Radius. The company took a $15.5 million restructuring charge; net revenues were $32.1 million in the third quarter, up from $30.9 million in the second quarter.

Aldus Moving Away from DTP? Publishing software pioneer Aldus has acquired another company outside the desktop publishing mainstream. The acquisition, CoSA, markets a video special-effects package called After Effects. Aldus recently acquired After Hours Software and its contact manager TouchBase Pro and calendar program DateBook Pro.

SIMM Prices Explode Memory prices have doubled and tripled in the months since an explosion leveled a Japanese factory that made much of the world's supply of epoxy resin used in assembling chips. The destruction of the plant caused concerns that supplies of DRAM would dry up. Street prices have jumped to between $70 and $80 for a 1MB SIMM and are expected to go higher—and stay higher.

Microtech Goes Chapter 11 Microtech International has filed for Chapter 11 reorganization with the U.S. Bankruptcy Court, District of Connecticut. According to the company, sales, customer service, and tech support will continue as usual while the court is considering the reorganization plan.

Claris Revenues Up Claris, a wholly owned subsidiary of Apple Computer, announced third-quarter revenues of $40.4 million, up 79 percent from $22.6 million reported in the same quarter last year.

Claris Update Claris has announced that its new graphics/word processor/presentation program, which was code-named EasyStreet, is now officially named ClarisImpact. The suggested retail price for the program, as well as for ClarisDraw, is $399 (see *Graphics* news, *Macworld,* September 1993, for more on both programs). Claris, 408/727-8227.

Sharp to Ship Newton-Based PDA Sharp Electronics Corporation (800/993-9737), manufacturer of Apple's Newton MessagePad, said at the Boston Macworld Expo that it will ship its own licensed version, the PI-7000 Expert Pad, by the end of August. The $700 Expert Pad has a slightly narrower plastic case with a lid for the pressure-sensitive LCD screen.

Warping out of Reality ASDG (608/273-6585) began shipping at Macworld Expo in August a $995 professional morphing program called ElasticReality. ElasticReality lets users create warping and morphing effects by quickly outlining two or more shapes and linking them. **m**

News

EDITED BY TOM MORAN

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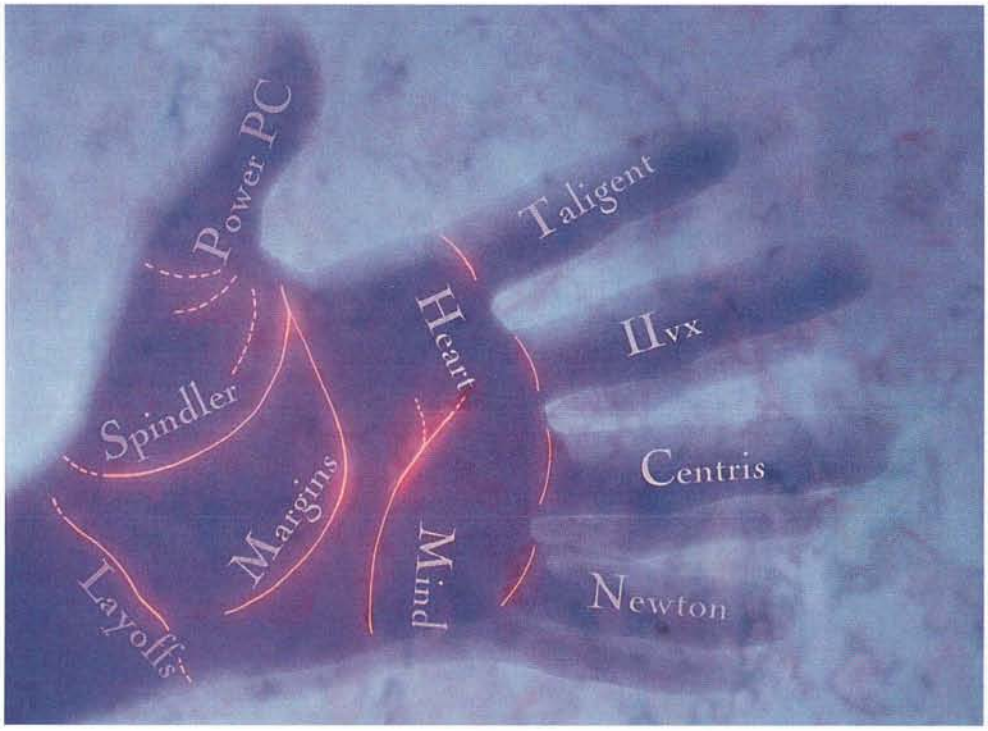
Reading Apple's Uncertain Future

AFTER THE CRASH



WILL CROCKER

Apple Computer has been building computers, a corporate culture, and an immense business for 16 years. Just last winter, Apple proudly boasted that it had virtually tied IBM as the number one supplier of personal computers in the world. At the beginning of 1993, Apple's stock sold for $65 a share, more than $1 billion worth of PowerBooks were on the street, and some of Apple's computers were so popular the company couldn't make them fast enough.

But in just a heartbeat this summer, the maverick company that set out to change the world with the Macintosh crashed like beta software and now finds itself in a battle for its survival.

First came the warnings from Wall Street analysts in June that Apple was stumbling. Then the company acknowledged it wouldn't meet its own profit goals for the rest of the year. Within days, John Sculley was out as chief executive, replaced by Michael Spindler, and insiders were predicting Sculley wouldn't last much longer as chairman.

By July it was carnage. Apple started laying off 2500 people, began axing R&D projects, dismantled whole departments, and even got set to phase out its much-vaunted child-care center. More bloodletting might be needed to deal with the fiscal crisis that led to a $181 million loss in the third quarter, an operating profit of less than a penny per dollar of sales, and stock that lay so smashed that 58 percent of Apple's value was wiped off the books between Clinton's inauguration and the Midwest's great summer floods.

It could take a year for the company to right itself, analysts believe—and even that depends on near-flawless execution of the company's shift from current Macintoshes to untested technologies, new products, and a new role on the data highway of the future.

It is 1985 all over again for Apple, when the Macintosh teetered on the brink of failure, and the company will need something the likes of PageMaker, PostScript, LaserWriters, and desktop publishing to pull through.

Experts say that more than ever, Apple's future rides on the PowerPC family of microprocessor, and the new personal computers Apple will build around the chips starting in 1994. The Macintosh is an aging design, and the Power-

PC chip along with a new operating system could give Apple machines that would match the features and performance of Pentium-equipped Windows NT computers that will start appearing around the same time.

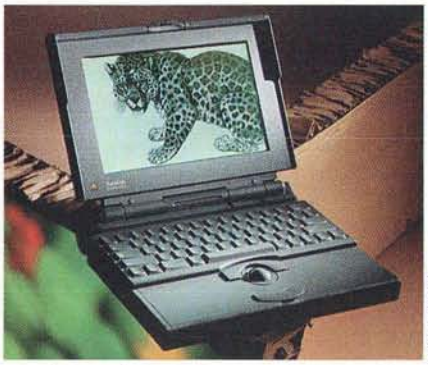
But with PowerPC, Apple faces the same difficult task any company does when making such a technology shift. It can't make a clean break with its millions of existing customers by rendering their software obsolete, so the PowerPC machines must be part Macintosh. But customers must also perceive them as computers that can do things a Macintosh simply cannot. If PowerPC machines turn out to be little more than faster Macs, that may not be enough to make a successful product. Apple is certainly aware of and working on this problem. The company has announced it is working on an intermediate operating system that will be able to run current Mac applications. Of course, Apple is also hard at work developing the native PowerPC operating system that will add fuel to any Apple resurgence in the next year or so.

And PowerPC Macs will have to succeed if Apple is to feed the appetite for funds for the Newton, the personal digital assistant that has more sizzle and heightened expectation attached to it than any product from Apple since the Macintosh. A whole division of the company has sprouted this year just to deal with the Newton and related products and services, even though the most optimistic forecasters don't believe PDAs will sell in any great number until 1995 or 1996.

But the Newton is far more to Apple than another box to sell. Newton sales are not where the money is; the company has declared it has to run its personal computer business like an IBM-clone company, and the competition is even more brutal in consumer electronics. Instead, the Newton represents the beginning of an Apple shift away from being a hardware company to becoming a software, communications, and information-services company. The Newton will help Apple get into interactive television, personal communications, the information-service business—and the systems software business that has made Microsoft the king of computing.

Indeed, Microsoft at this stage might be something of an ally for Apple. Microsoft isn't exactly much loved in the industry these days. There are plenty of companies hoping the FTC will crack down on the software giant, and are looking for ways to deal with somebody besides Bill Gates for crucial software. And Apple does appear ready to fill that void: having learned from its disastrous mistake of not licensing Macintosh technology to others, Apple has already licensed both its Newton PDA and its PowerPC technology to other companies.

Apple isn't finished quite yet. It has a brand name other companies would love to own. It has some of the world's best technologists. And it has a two-year-old partnership (Taligent and Kaleida) with IBM, with whom Sculley discussed a merger. It has more recent deals with Japanese giants like Sony, Toshiba, and Sharp. Plus Apple owns a piece of ventures such as communications start-up General Magic, whose other participants include such companies as AT&T, a potentially crucial partner in communications and information services and a much-rumored merger partner. Tending those strategic business relationships instead of the bottom line might be what cost Sculley his CEO job. But they could wind up being the real key to Apple's successful metamorphosis to a new and once-again profitable company.—RORY J. O'CONNOR



MARK JOHANN

Apple is replacing the PowerBook 160 with the faster PowerBook 165 (shown).

PowerBook 165 Adds Zip

FASTER PROCESSOR

Apple is replacing the PowerBook 160 with the PowerBook 165, which has a 33MHz 68030 processor that's faster than the 160's 25MHz 68030. The PowerBook 165 will come with 4MB of RAM and either an 80MB hard drive or a 160MB hard drive. The only other change is that Apple will bundle the 165 with AppleTalk Remote Access (ARA) client software, AppleLink, and short demonstration versions of third-party software for mobile computing.

At press time, Apple had not set prices for the PowerBook 165, but the company predicted that prices would be in about the same range as the (recently reduced) prices for the 160.—T.M.

Giant-Killer QuicKeys

SWATS TASKS

Who can forget the unlucky tailor who found himself appointed official giant-killer after yelling that he had killed "seven with one blow"?—seven flies, that is. Macro writers are used to killing many Macintosh tasks

continues

In Brief

Slow Boat to QuickDraw

Apple has announced that the long overdue QuickDraw GX is in beta testing. The upgrade puts many advanced graphics, color, and typography technologies into the Mac OS. Users can expect more graphics capability, color management, more-flexible type handling, and icon-based print management from the Mac desktop. The software is scheduled to ship in early 1994.

MoviePak Price Drops

RasterOps has cut the list price of its MoviePak video-compression/decompression daughterboard from $1999 to $999. The board snaps onto RasterOps video-display adapters. The company has also reduced prices on its Editing Aces Suite. The NTSC version now costs $3899, and the PAL version costs $4099. 408/562-4200.

Mac-to-TV Converter

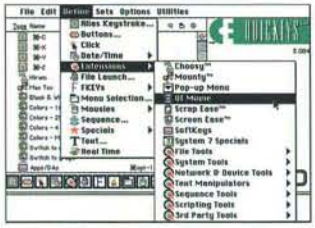
TelevEyes/Pro, shipping from Digital Vision, is a $799.95 computer-to-TV video-scan converter with genlocking capabilities in an external box. It converts Mac or DOS PC–compatible video signals into recordable NTSC composite or S-Video output (a PAL version is on the way). With the genlocking feature, you can lay Mac screens over live video. 617/329-5400.

Real-Time News Feeds

Desktop Data's NewsEdge pipes live feeds from over 100 news wires to a customer's local OS/2 server via an FM, satellite, leased-line, or X.25 broadcast. You can now access that information with the NewsEdge/Mac client. The package supports user-defined searches and monitors stories according to user-defined profiles. The service costs $20,000 per year for up to ten users; additional users cost $300 per year. Subscription price does not include wire-service fees. 617/890-0042.

in one blow, and with version 3.0 of QuicKeys, CE Software goes for a better flyswatter.

Chances are, if a feature existed in QuicKeys 2, it's been tweaked for QuicKeys 3.0. Most Extensions now have a smaller memory footprint, and some that performed similar or related things have been melded. For instance, MenuWait, CursorWait, ButtonWait, and WindowWait now coexist in the single Wait Extension. There



QuicKeys 3.0's Extensions menu, complete with lots of juicy new tools.

are also several new Extensions, including PowerBook Specials for mobile Mac-ers, and GoSub, which can call one sequence from within another. Sequence recording has been improved; QuicKeys 3.0 will correctly record waits for windows, button clicks, and menu drags as specific events, instead of inserting generic timed pauses and mouse-clicks.

The Apple Events Extension now lets you browse applications for supported Apple events, and the DoScript Extension lets you send scripts in the application's native script language. QuicKeys 3.0 is available as a dialect of AppleScript. Users may write scripts in the QuicKeys dialect, which can be used in applications that don't support Apple events.

On top of all the changes to the guts of the product, CE Software has also modified the user interface, adding color, floating palettes for recording Sequences, and a Utilities menu for accessing the Template Printer, Extension Manager, and other utilities from the main window.

QuicKeys is shipping for $169. CE Software, 515/224-1995.—CAMERON CROTTY

Mirror's Stereo Display

MULTIMEDIA

Mirror Technologies is shipping the ProView 14-inch Multimedia Color Display ($499), a monitor designed for the multimedia market. The display features built-in speakers and a headphone jack, and can connect to a CD-ROM drive for playing audio CDs. The ProView comes with cables for connecting to audio sources.

The ProView is expected to compete with Apple's AudioVision 14 Display (see *News*, September 1993). The Mirror product is controlled primarily by hardware, while the Apple monitor offers software controls. The volume control and headphone jack are located on the front of the Mirror monitor, while the audio input jacks are located on the back; on the Apple product, the audio, video, and

ROBERT PERRY

Mirror's ProView 14-inch Multimedia Color Display has stereo speakers on its sides.

ADB ports are on the front of the monitor. Unlike the Apple monitor, the ProView does not accept input from microphones; its audio-input ports connect only to other audio devices such as CD players.

The Mirror monitor offers 640-by-480-pixel resolution at a refresh rate of 66.7Hz. It works with built-in video and with video cards for 14-inch displays, and at resolutions up to 1024 by 768. It also meets the Swedish MPR-II guidelines for ELF emissions. Mirror Technologies, 612/633-4450.

—JOANNA PEARLSTEIN

Docking the Duos

Company	Product	Price	Ports	Other
Apple Computer	Duo Dock	$1079	ADB, floppy, modem, composite video, monitor, printer, SCSI, sound	NB, SS, FPU, FD, 8b/16"
	MiniDock	$589	ADB, floppy, modem, composite video, monitor, printer, SCSI, sound	SS, 8b/16"
	Duo Floppy Adapter	$135	ADB, floppy	PM, SS
E-Machines	PowerLink Presentor	$499	ADB, composite video, monitor, sound	PM, 8b/16", 4b/20"
	Etherdock	$699	ADB, Ethernet, floppy, modem, composite video, monitor, printer, SCSI, sound	SS, 8b/16"
Lapis	SCSIDock	$199	ADB, SCSI	PM, SS
Newer Technologies	Color MicroDock	$345	ADB, composite video, sound	PM, SS, 8b/21", 4b/20"
	SCSI MicroDock	$175	ADB, SCSI	PM, SS
RasterOps	DuoMate 8	$499	ADB, floppy, composite video, monitor, sound	PM, 8b/21"
	DuoMate 16sc	$649	ADB, floppy, composite video, monitor, sound	PM, 16b/21"

ADB *composite video* *Ethernet* *floppy* *modem* *monitor* *printer* *SCSI* *sound*

b = video bit depth (for example, 4b/16"= 4-bit color display on a 16-inch monitor); FD = built-in floppy drive; FPU = optional floating-point unit; NB = NuBus; PM = does not cover the Duo's printer/modem port; SS = offers a security slot.

Windows Apps on Macs

EMULATION SOFTWARE

After announcing a strategic alliance with Microsoft this year, Insignia Solutions is developing SoftWindows, emulation software that will let Windows applications run on the Mac. Scheduled for release when PowerPC machines ship next year, it will be an upgrade for Insignia's SoftPC with Windows product. According to Insignia, SoftWindows will let Macs retain their native speeds during emulation. The product is expected to list for about $499.

With the Microsoft alliance, Insignia gained access to Windows source code, allowing Insignia to recompile Windows to run on the Macintosh. Insignia Solutions, 415/694-7600; Microsoft, 206/882-8080.

—JOANNA PEARLSTEIN

Docks for the Duos . . . Finally

CONVENIENT EXPANSION

Six months after the PowerBook Duos debuted, no one but Apple was shipping docks for the laptops; now ten docks are available, offering various combinations of ports that let the Duo do more than just look good sitting on your desk (see the table, "Docking the Duos"). The SCSI MicroDock from Newer Technology (316/685-4904) lets users plug in their HDI-30 SCSI Disk Adapter cable (for setting up the Duo as an external hard drive on another Mac) as a standard SCSI cable, or use a standard SCSI cable to set up the Duo in SCSI disk mode. Apple (408/996-1010); SuperMac's E-Machines division (408/541-6100); Lapis (510/748-1600); RasterOps (408/562-4200).—GIDEON YAFFE

PowerBook Storage Tops 300MB

INTERNAL OR EXTERNAL DRIVE

Procom Technology and APS Technologies have both introduced a 340MB hard drive small enough to fit internally in PowerBooks and PowerBook Duos. The highest-capacity drives available for the PowerBook, they consume only 1 watt of battery power while the PowerBook sits in idle mode. Both companies are using Toshiba's MK-2326FB mechanism, which according to Toshiba's tests provides an average access time of about 20ms, although APS says that its own "real-world" tests yield different results: an average access time of 26ms. Both Procom and APS are selling the drive as an internal for the PowerBook, an external for use with any Mac, and as an internal font-storage drive for the LaserWriter Pro 630 printer.

PAUL BERG

The Procom Atom 340 external drive comes in an internal version for PowerBooks.

The Procom drives, called the Atom 340 series, list for $1295 for the internal units for the LaserWriter Pro 630 and the PowerBook, and $1395 for the external units equipped with an AC power supply. The APS drives, called the T-340 series, are available directly from APS for $799 for the internal units, $859 for external units with an AC power supply, and $929 for an external unit with both an AC and DC power supply. Procom, 714/852-1000; APS, 816/478-8300.—GIDEON YAFFE

BUGS & TURKEYS

QuickMail Administrator 2.6 crashes if you try to remotely administer a QuickMail Server on a single-zone network. It works fine on multizone networks. A patch is planned for summer release. For now, CE Software recommends using Farallon's Timbuktu to remotely administer single-zone networks.

With Alysis More Disk Space 1.0.2 under System 7.1, you can't save a compressed document to a floppy disk without the document decompressing. The version 2.0 fix is free on request to registered users.

Notice that little slot (with the padlock icon) on the back of your PowerBook Duo's MiniDock? Ever tried something like Kensington Micro's device for using that little slot to lock down your MiniDock? Well, if you want to protect your Duo, don't bother, because even after you lock the MiniDock anyone can still undock your PowerBook Duo from it and walk.

Apple shaved a few bucks off the StyleWriter II by omitting the $20 cable required to connect to a Mac. The Peripheral-8 Cable included with the original StyleWriter is now available separately.

Macworld will send you a Bug Report T-shirt if you are the first to inform us of a serious, reproducible bug that we report in this column, or a Turkey Shoot T-Shirt if we shoot your turkey in this space. See *How to Contact Macworld.*

PowerPC Tools

C++ FROM SYMANTEC

C++ is generally accepted as the best language for cross-platform development, and its capabilities are soon to get a workout as PowerPC technology fits itself into the world of existing Macintosh applications. Ideally, Apple-oriented developers would like a single dialect of C++ that could compile applications able to run on either PowerPC RISC chips or on the Motorola 680X0 series processors, without requiring major differences in the application source code. And it would be very nice indeed if the same source code could produce Windows applications for computers based on Intel's new Pentium CPU.

Those features are the aim of an agreement that Apple formulated with Symantec Corporation in 1992, and products based on the agreement have already started appearing. As a first step, Symantec's new C++ 6.0 is not just an upgrade from the popular Think C 5.0—the new C++ also includes Apple's SourceServer for managing complex programming projects and Apple's ToolServer for accessing the Macintosh Programmer's Workshop tool set. When the first Bedrock tools (Bedrock is Symantec's name for the whole cross-platform development environment) become available in 1994, they are expected to extend existing C++ 6.0 capabilities to generate Windows and PowerPC applications. By late 1994, you can expect to see what are essentially Macintosh applications running on

continues

In Brief

Mac on Unix

Silicon Graphics has announced Indy, a $4995 addition to its Indigo line of Unix workstations. Slated to ship in September, Indy is powered by a 100MHz RISC chip and ships with a digital color video camera. Why might you care? Because Quorum is shipping Equal 1.0, bundled on a $1295 CD-ROM with Macintosh versions of Microsoft Word and Excel. Equal is an application adapter that processes Macintosh Application Programming Interface (API) calls using Unix system resources. The current version of Equal is only certified to run Microsoft Word and Excel, but future versions of the product are expected to be more flexible. Silicon Graphics, 415/960-1980; Quorum Software, 415/323-3111.

NEC MultiSpin CD-ROM Prices Drop

NEC has reduced the prices on its MultiSpin CD-ROM readers. NEC does not give suggested retail prices for its products, but the company estimates that the new selling price for the MultiSpin 38 will be $350, the MultiSpin 74 will be $550, and the MultiSpin 84 will be $455. 708/860-9500.

Aladdin Releases Desktop Tools

Aladdin Systems expects to ship Desktop Tools, a collection of utilities, in September. The collection includes control panels designed to enhance copy functions, help find frequently accessed files, switch printers, and make erased files unrecoverable. The Desktop Tools package incorporates technology that was originally developed in two other products, SpeedyFinder 7, which is a shareware control panel written by Victor Tan, and Easy Print, which places printer icons on the desktop for easy switching between printer devices. Desktop Tools will retail for $89.95.

hardware that has no relation to traditional Macs.

The very first of these applications will probably use an Apple/Symantec emulator, software that models a Mac in PowerPC instructions. This technique would slow down a 50MHz PowerPC so that it would perform like a 25MHz 68040 system, but at least it will preserve your existing software investment. Really fast applications that take optimal advantage of the PowerPC's own instruction set will start appearing after Apple and Symantec release to developers a native-mode C++ compiler for the PowerPC. The dazzling display of PowerPC speed that Apple previewed at the Worldwide Developer's Conference in May of this year was made possible by Apple's in-house native compiler tools, and as you read this, Symantec is filling out the tool set to bring a complete development system in the first half of 1994.

—CHARLES SEITER

LUIS DELGADO

The 21-inch Diamond Pro 21FS display from Mitsubishi can show 1600 by 1280 pixels.

Mitsubishi Introduces Flat, Square Monitors

REDUCED DISTORTION

Three monitors (15, 17, and 21 inches) from Mitsubishi feature a flat, square CRT intended to reduce distortion at the corners and overall glare. The Diamond Scan 15FS's resolution reaches 1024 by 768 with a 76Hz vertical scan rate; the Diamond Scan 17FS goes to a resolution of 1280 by 1024 at 74Hz; and the Diamond Pro 21FS tops out the line at 1600-by-1280 resolution and just over 75Hz. All three of the monitors feature a .28mm dot pitch and require an adapter (free) to function with the Macintosh. The 15FS and 21FS are currently available for $645 and $2999, respectively; the 17FS will be available in late September for $1299. Mitsubishi Electronics, 714/220-2500.

—CAMERON CROTTY

The Return of E-Machines

CARDS, MONITORS, AND A DOCK

E-Machines has completed a major transition and is reemerging as the division of SuperMac aimed at creating products for low- and middle-level users. Among other new products, E-Machines is introducing two families of graphics cards, two monitors, and another docking station for the PowerBook Duo.

The graphics card lines—called the Futura II and the Ultura—both offer 24-bit color and accelerated QuickDraw. Currently all alone in the Ultura family is the Ultura LX ($999), which accelerates QuickDraw by up to 900 percent. The Futura II products offer 500 percent acceleration; they are the SX ($499), which supports 17-inch monitors, and the LX ($899), which supports monitors up to 21 inches. Both Futura II's can fit in the 7-inch NuBus slot of the Centris 610. A daughterboard can be added to either of the Futura II's to add Ethernet capabilities, and the combined boards are still small enough to fit in the Centris 610's NuBus slot.

E-Machines' two new monitors both sport 20-inch screens and are capable of displaying multiple resolutions. The E-20 and T-20 can display either 1024 by 768 pixels or 1152 by 870 pixels. For the T-20's higher-quality Trinitron display, E-Machines has set a list price of $2899; the E-20 has a list price of $1899.

The docking station, which is called the Etherdock, provides Duo users with instant Ethernet capabilities and has a list price of $699. The docking station resembles Apple's MiniDock (see "Docks for the Duos . . . Finally," elsewhere in *News*, this issue) SuperMac's E-Machines division, 408/541-6100.—GIDEON YAFFE

NOTE TO OUR READERS:

"Top Fifteen Business Software Packages" does not appear this month.

QuickFlix eschews track-style editing in favor of a scene/clip storyboard (in background).

QuickFlix Pix Fix

VIDEO EDITING

VideoFusion's QuickFlix requires less hardware, money, and expertise than existing solutions to digitize and edit QuickTime movies. The package offers standard digitizing options for stereo sound and video (frame rate, size, and compression); two video and three audio tracks; simple cut, copy, and paste controls for editing clips; and basic special effects, including titling, colorization, transitions, and clip layering. Currently available from VideoFusion for $149; 419/891-1090.

—CAMERON CROTTY

THE AMCOEX INDEX OF USED MAC PRICES

Machine/RAM/Hard Drive	Average Sale Price	Monthly Change
Mac SE/2MB/20MB	$500	$0
Mac Portable/1MB/40MB	$750	+$100
PowerBook 100/4MB/40MB	$900	$0
PowerBook 140/4MB/40MB	$1200	–$150
Mac Classic/2MB/40MB	$550	–$25
Mac SE/30/2MB/40MB	$750	–$75
Mac LC/2MB/40MB	$700	$0
Mac II/4MB/40MB	$750	–$50
Mac IIsi/3MB/40MB	$975	–$50
Mac IIcx/4MB/80MB	$1150	–$100
Mac IIci/4MB/80MB	$1450	–$300
Mac IIfx/4MB/80MB	$1700	–$200
Apple 12–inch B&W display/board	$125	$0
Apple 13–inch RGB display/board	$375	–$25
LaserWriter Plus	$600	$0
LaserWriter IINT	$875	–$25

Index provided by the American Computer Exchange of Atlanta, Georgia (800/786-0717). It reflects sales during week of July 22. Configurations include keyboard and exclude monitor and display board for noncompact models.

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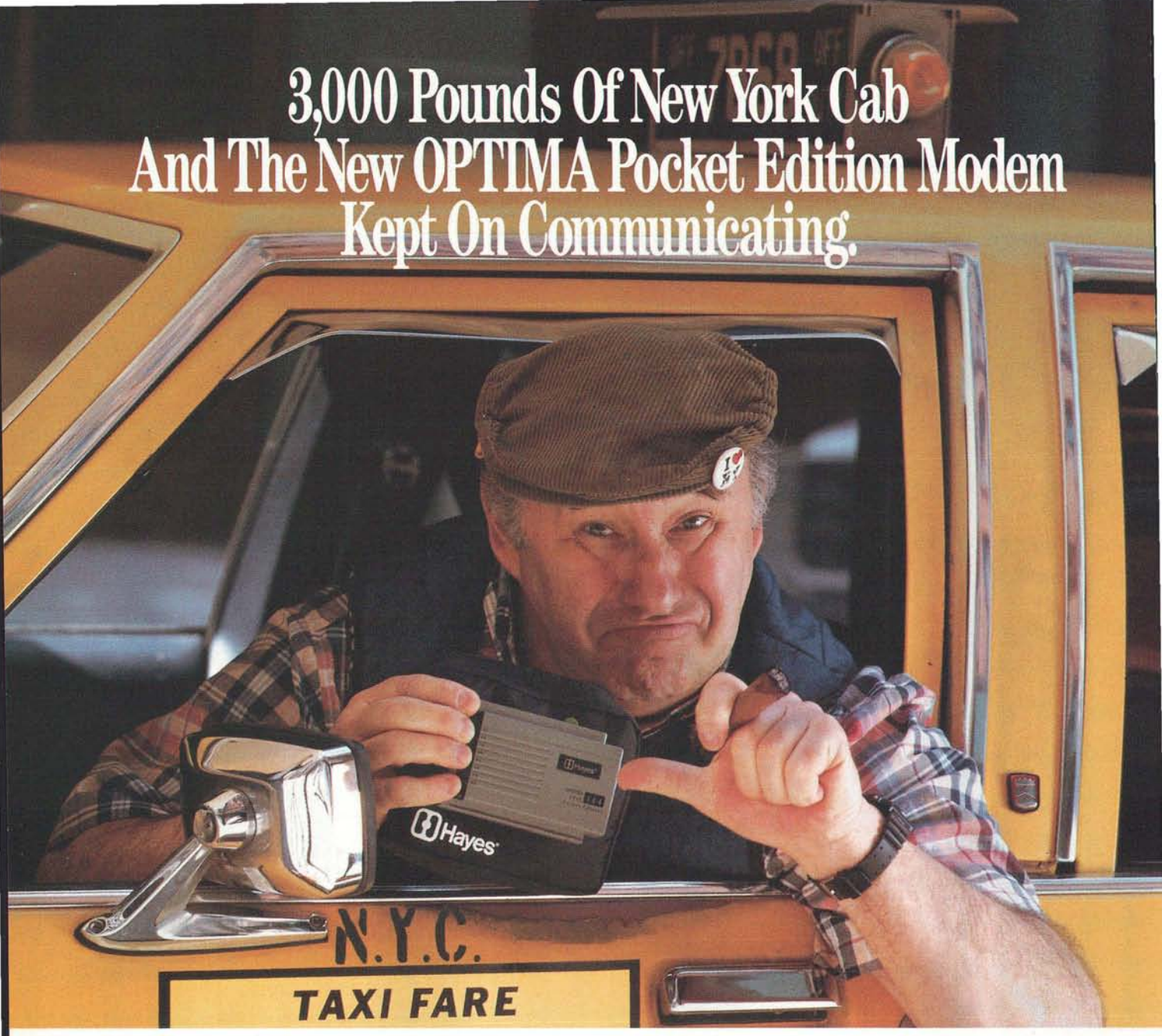
3M *Reliability*

Circle 109 on reader service card

3,000 Pounds Of New York Cab And The New OPTIMA Pocket Edition Modem Kept On Communicating.



OPTIMA™ 144 + FAX144 Pocket Edition®

Picture this. It's four o'clock and you've closed the deal. But, you need to check the inventory data base at the plant and Fax the order confirmation by five. You jump out of the cab. Your portable modem falls. The cabbie takes off, and *crunch*. Now what? Well we ran over our new OPTIMA™ 144 + FAX144 Pocket Edition® in its soft carrying case and the OPTIMA still communicated ... flawlessly.

Now we're not recommending *you* try this, but who knows what can happen on the road. What's important is that the OPTIMA Pocket Edition is from Hayes. It's for your Powerbook™ and Macintosh™ desktop computer. And its got it all. 144 speed. The convenience of Fax. Data throughput to 57.6kbps. Error control and data compression. AC or battery power. And, **both Smartcom II® and Smartcom™ FAX for the Mac™ communications software, a $228 value, absolutely free!**

The Pocket Edition also comes with the Hayes® patented Improved Escape Sequence with Guard Time and Hayes Standard AT Command Set. Just some of the features that helped our OPTIMA modems win the 1992 World Class Award from *MACWORLD* magazine. And it's all backed by our fast, efficient Technical Support team.

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Circle 147 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

By Cameron Crotty

THIS SECTION COVERS MACINTOSH PRODUCTS FORMALLY ANNOUNCED BUT NOT YET EVALUATED BY *MACWORLD*. UNLESS OTHERWISE STATED, THE MINIMUM REQUIREMENTS FOR OPERATION ARE A MAC PLUS, WITH 1MB OF RAM, RUNNING SYSTEM 6. ALL INFORMATION AND PERFORMANCE CLAIMS ARE SUPPLIED BY THE PRODUCT VENDOR AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY *MACWORLD*. ALL PRICES ARE SUGGESTED RETAIL. PLEASE CALL VENDORS FOR INFORMATION ON AVAILABILITY.

HARDWARE

12000C and Slide Kit

This 1200-dpi 24-bit flatbed color scanner can handle reflective original documents up to 8½ by 11 inches and ships with Adobe Photoshop 2.5. An optional Slide Kit attachment adds the ability to scan transmissive materials. $1995; Slide Kit $795. Tamarack Technologies, 408/956-0144, 800/643-0666; fax 408/956-1552.

APS LW Pro-Drives

These hard drives come ready for installation into Apple's LaserWriter Pro 630, complete with brackets, cables, and instruction guide. Also, if you have an extra 2½-inch SCSI drive (recovered from a PowerBook, say), you can install it in your LaserWriter 630 using the APS LW Pro-Kit. 80MB $289; 120MB $379; 160MB $529; APS LW Pro-Kit $69. APS Technologies, 816/478-8300, 800/235-2752; fax 816/478-4596.

Dycam Model 4

Watch the digital birdie. This 24-bit color camera captures photographs and stores them in its RAM for later transfer and editing. The camera is fully automatic, including focus, exposure, and flash; it can store 8 to 32 pictures, depending on desired image quality; and it captures images at up to 496-by-365-pixel resolution. Exposure times range from 1/2000 to ⅔ second, depth of field from 3 feet to infinity. Runs on a rechargeable NiCad battery—one charge is good for about 100 hours. The camera ships with a serial cable and the company's downloading and editing software. $1495. Dycam, 818/998-8008; fax 818/998-7951.

Fan Card

It's OK if you're full of hot air, but your Mac shouldn't be. This fan is mounted on a NuBus card that fits into the Mac's NuBus slot and keeps your Mac's insides cooler than Bart Simpson. A half-length version (the Mac I) is also available. Mac II $109.95; Mac I $89.95. T. S. Microtech, 310/787-1640, 800/959-9419; fax 310/787-1647.

Impact 030/Color Classic

The Color Classic might look cool, but it's not going to break any speed records without some help. This 68030-based accelerator board runs at 32MHz and comes with a 32K cache and a socket for an optional FPU. Users can turn the caching and math functions on and off via an included control panel. $479; with FPU $569. Extreme Systems, 206/575-4223, 800/995-2334; fax 206/575-3928.

MultiPort/LT

It's smaller! It's lighter! It's an AppleTalk router! The MultiPort/LT allows a large LocalTalk LAN to be segmented into four individual LocalTalk networks, and can also be configured to deliver IPTalk 1 or 2 connections, MacIP sessions, and DECnet Level 1 routing services to LocalTalk-based users. The unit supports SNMP, comes with 1MB of RAM (expandable to 4MB), and ships with the company's Multiport Manager software. Thick, thin, and UTP Ethernet options are available. $1995. Webster Computer Corp., 408/954-8054; fax 408/954-1832.

Mustek Paragon Scanners

Heading up this line are the Mustek Paragon 1200 and 600, two 24-bit color flatbed scanners weighing in at 1200-by-600-dpi and 600-by-300-dpi true resolution, respectively. Both devices can handle reflective originals up to 8½ by 14 inches; the Paragon 1200 ships with Adobe Photoshop 2.5, and the Paragon 600 comes with Photoshop LE. Mustek also offers the Paragon Color, an 800-by-800-dpi, 24-bit color hand-held scanner that ships with Photoshop LE. 1200 $1995; 600 $1395; Color $649. Mustek, 714/453-0110, 800/468-7835; fax 714/453-1010.

Mustek Paragon Scanners

OmniScan 256

OmniScan 256

Users can choose a true resolution of 100, 200, 300, or 400 dpi on this 8-bit gray-scale hand-held scanner. The product ships with the company's software for OCR (OmniPage Direct), fax (FaxMaster), and image editing and scanning (Image Assistant), all rolled into one seamless package. 5MB min. memory; requires Mac II and 8MB of free hard disk space. $595. Caere Corp., 408/395-7000, 800/535-7226; fax 408/354-2743.

PageBlaster Universal FM

If that lazy low-cost printer of yours isn't pulling its weight, you might try adding a plain-paper fax feature to it. PageBlaster converts page-description data from a fax modem and then sends it to the printer. You can even turn your Mac off and have the unit print faxes while you're away or store them to print later. The included software allows you to set printing, storing, paper-size, and print-quality options. Hardware options include up to 4MB of RAM (ships with 1MB), a 9600/2400-bps fax modem, additional fonts, and a PostScript converter. $395; with PostScript software $495. PRDS, 510/226-8930, 800/334-1997; fax 510/226-8631.

PerFit Fax Modem 1414

If you're going on the road, you *can* take it with you. This data/fax modem (both 14.4-Kbps) draws its power from the Mac's ADB port and is compliant with V.32, V.32bis, V.42, V.42bis, MNP classes 2 through 5, and Group III fax protocols. The unit supports caller ID, can recognize distinctive ring services (available from local phone companies), and supports the Auto Wake function of the Outbound Notebook computer, allowing it to turn on the Outbound when the PerFit detects an incoming call. $379. PerFit, 303/530-7333; fax 303/530-5409.

Phaser IISDX

This 300-by-300-dpi dye-sublimation color printer can produce a page in a little over 3 minutes at an average cost of $2.25 per page, and it supports PostScript Level 2. The printer ships with an Adobe Photoshop plug-in export filter for faster processing, allowing users to print at higher speeds as well as with an AppleTalk interface, and is upgradable to Ethernet. $9995. Tektronix, 503/682-7377, 800/835-6100; fax 503/685-3063.

Phaser IISDX

SIMMdoubler II

Don't you just hate throwing away all those 1MB SIMMs when you run out of slots but still need more memory? This product is a set of four credit card–size boards that plug into the original Mac SIMM slots. Each board carries two standard SIMM sockets, doubling the total SIMM capacity of the Macintosh II, IIx, IIcx, or IIci. $139 per board. MicroMac Technology, 714/362-1000; fax 714/362-5428.

The si/ci Upgrade

After you purchase this upgrade, you box up your IIsi and ship it to Digital Eclipse, which tests your Mac to make sure it can handle the upgrade, then replaces the clock crystal that controls how fast your processor runs, and installs a heat sink on the processor. The result is a faster machine that still has an open expansion slot. The company also fixes the sound-dropout problem experienced by some IIsi owners. If you include your NuBus adapter card with an FPU, the company will also upgrade the FPU. *continues*

Price includes shipping both ways. $299. Digital Eclipse Software, 510/547-6101, 800/289-3374; fax 510/547-6104.

TriCoder Portable Bar-Code Reader

This portable bar-code reader collects up to 64K of data for later uploading to any Mac via the ADB port. The unit reads several bar-code formats (including UPC) and comes with an ADB or serial interface and the company's inventory-control software. $799; 256K model $899. Worthington Data Solutions, 408/458-9938, 800/345-4220; fax 408/458-9964.

ViewSonic 17

A 17-inch monitor with .28mm dot pitch with a 76Hz refresh rate at 1280 by 1024 pixels. The product features built-in color control, moiré tuning, and video-input voltage adjustments. The product meets the Swedish MPR-II emission guidelines $1599. ViewSonic, 909/869-7976, 800/888-8583; fax 909/869-7958.

SOFTWARE

AmericaAlive NavigaTour

Always remember: No matter where you go, there you are. With this package, you can learn about where you're going before you get there, or remember where you were once you leave. This customizable reference software includes maps and text about U.S. states, cities, national parks, and major attractions. Users can add their own text, pictures, QuickTime movies, and recorded comments. 4MB min. memory; requires Mac II, System 7. $129. MediAlive, 408/752-8500; fax 408/752-8501.

BridgeMaster

Whether you need to brush up on your Stayman bidding or practice squeezing extra points out of a weak hand, a computer playing-partner can turn the trick. This bridge software recognizes several bidding conventions and offers computer opponents with adjustable playing styles. $59.95. IntraCorp, 305/591-5900, 800/468-7226; fax 305/591-1561.

CD-It

Okay, so you've got data, and you've got a Philips CDD-521 Recorder for creating WORM disks, but what about software? This package allows you to record CD-ROM (ISO 9660), audio CD, CD-I, mixed-mode, and multisession compact discs. Single-format versions are also available. 4MB min. memory; requires Mac II. $2995; bundled with Philips CDD-521 Recorder $7995; single-format software $1295. OptImage, 515/225-7000, 800/234-5484; fax 515/225-0252.

CD-It

ClickArt Studio Series

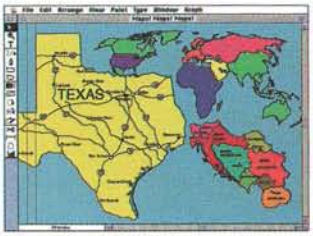
A series of five portfolios of EPS clip art images: Business Art (equipment, computers, corporate icons), Illustrations (maps, food and drink, entertainment), Artistry & Borders (animals, flowers, silhouettes), Sports & Games (fields and courts, board games, equipment), and Animals & Nature (pets, game animals, dinosaurs). $99.95 each. T/Maker Company, 415/962-0195; fax 415/962-0201.

Collision Calculator

This HyperCard-based accident-reconstruction software will tell you just how fast you were going when you mowed down that parking meter. The software solves time-speed-distance problems, calculates conservation of linear momentum, and handles 14 of the most commonly used acceleration/deceleration problems. The package can also perform unit conversions, including length, weight, volume, and metric to U.S. systems. All-metric version also available. $99.95. Joe Coyle & Associates, 619/740-6966; fax 619/740-1198.

Disney Screen Saver

Now Disney fans can save their screens with Mickey Mouse, Donald Duck, and Goofy the . . . the . . . whatever Goofy is. These After Dark–compatible modules star the 101 Dalmatians, the Little Mermaid, Peter Pan, Pinocchio, Beauty and the Beast, and others. The After Dark screen saver engine is included. 2MB min. memory. $59.95. Berkeley Systems, 510/540-5535, 800/344-5541; fax 510/540-5115.



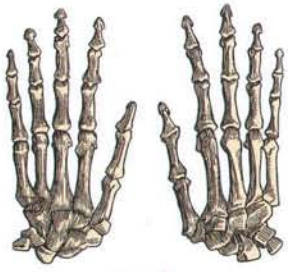
EPS Clip-Art Maps

EPS Clip-Art Maps

Imagine the world at your fingertips. Imagine the world in encapsulated PostScript. Now imagine this set of three collections of clip art maps. USA State-by-State Pro features maps of states, major cities, interstates, and waterways. World Maps Pro covers the entire world with regional maps of continents and countries. World Hot Spots Pro is a collection showcasing regions currently in the news, including Bosnia-Herzegovina/Yugoslavia. $129.95 per package. Bruce Jones Design, 617/350-6160, 800/843-3873; fax 617/350-8764.

FEBTechnical

Correction fluid and hand-lettered equations are becoming a thing of the past, thanks to technical font sets like this one. The package includes both TrueType


Hands

That kink you feel in your wrist from typing at your computer could lead to painful tendinitis or even carpal tunnel syndrome so help reduce the strain keyboarding puts o

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and PostScript fonts, and features lowercase Greek letters, symbols for chemical formulas, special engineering variables, math symbols, fractions, and a full set of sub- and superscripted numbers. $59.95. FEB Software, 804/222-2215; fax 804/226-1934.

FloorPlan Plus for Macintosh
This space-design software allows users to create accurate scale floor plans with up to 16 layers (for wiring, plumbing layouts, and so on). The package includes a 125-object library with furniture and appliances, and handles up to 27 million square feet of space at 1/16-inch accuracy. 2MB min. memory. $99.95. ComputerEasy International, 602/829-9614; fax 602/829-9616.

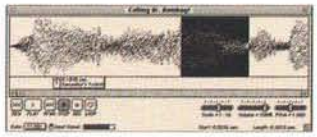
Fontek DesignFonts
If a picture is worth a thousand words, then each one of these six fonts is worth a couple of medium-size novels. Each font collection (Attitudes, Organics, Naturals, Radicals, Primitives, and Incidentals) contains 70 to 100 graphic images created using both digital and traditional methods ranging from woodcuts to cut paper. All fonts ship with both PostScript Type 1 and TrueType formats. $89.95 per collection. Letraset USA, 201/845-6100, 800/343-8973; fax 201/845-5047.

FoolProof
While the cat's away, the mice will play—or at least the kids will play with the mouse. This product prevents unauthorized users from creating, moving, or destroying files and folders. It also locks the control panels and the Chooser, disables all desktop-altering menu commands, and prevents software copying. The system cannot be subverted by booting from a floppy disk. $39.95; 10-pack $179; 30-pack $349; building license $589. SmartStuff Software, 503/775-2821; fax 503/775-6874.

Harbor Master 2.0
Surf's up, dude. This package uses the harmonic method to predict tides and tidal currents throughout a three-year period, so you can boogie out of work just in time to catch perfect sets. Or, if you depend on the tide for your work, you might find this package useful. The product displays data in several formats, shows the moon phase, the sunrise and sunset times, and annotates the high and low tide times and heights, as well as the time and speed for tidal ebb and flow. $150. Zihua, 408/372-0155, 800/659-0155; no fax.

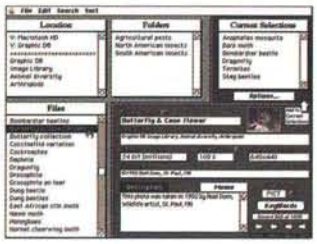
Help Network
This software collects remote system profiles via a probe installed on supported Macs, and then analyzes the information using a built-in knowledge base covering over 3000 third-party products. Once problems are detected, the software creates a report with complete configuration information, descriptions of problems or possible conflicts, and detailed instructions on how to resolve them. Quarterly and monthly update subscriptions are available. 25-pack $520; 50-pack $989; 100-pack $1656; quarterly updates $149 per year; monthly updates $249 per year. Teknosys, 813/620-3494; fax 813/620-4039.

Kaboom 2.0
It's quiet . . . too quiet. So turn up the volume on your Mac and take a look at the latest version of this sound software. Users can associate sounds with common Macintosh events, ranging from emptying the Trash to simple typing. Included is the Kaboom Factory sound editor, which can combine sounds and add effects like echo, amplify, and reverse. Package ships with 150 sound clips. $49.95. Nova Development Corp., 818/591-9600, 800/395-6682; fax 818/591-8880.



Kaboom

LabView 3.0
Users build modules for acquiring data from thousands of programmable instruments with software objects represented by icons, and then analyze the data with included routines. Version 3.0 of this science/engineering tool includes new measurement-based analysis features, a control editor for creating user-defined controls, and built-in global variables. 8MB min. memory; requires FPU. $1995. National Instruments, 512/794-0100, 800/433-3488; fax 512/794-8411.



MacPresents - Multimedia Database Manager

MacPresents - Multimedia Database Manager
Creating multimedia presentations is stressful enough without dealing with a jumbled mess of source materials. This software helps you organize animations, PICT files, and QuickTime movies; it stores file size, color depth, image dimensions, source information, and additional notes along the way. The software supports keyword searches and previewing. 2MB min. memory; requires Mac SE. $149. Educational Multimedia Concepts, 612/379-3842; no fax.

Now Fun
Customizing your Mac is like customizing a car—a little paint, a touch of chrome, and that something extra under the hood transform an assembly-line machine into a personal statement. This five-pack of utilities lets you put your own stamp on your Mac with a cursor-replacement utility, a screen saver compatible with After Dark and QuickTime, *continues*

our hands with our rounded, cushioned, height-adjustable wrist rest.

Wrist Rest

ergodyne WorkSmart

software for your hardware 1-800-323-0052

Circle 39 on reader service card

a utility that plays sounds keyed to Mac events, Finder color-adjustment software, and an updated DeskPicture 3.0 for creating both tiled and full-page color backdrops. Requires System 7. $69. Now Software, 503/274-2800, 800/237-3611; fax 503/274-0670.

Optimem

This memory-optimization extension constantly reallocates memory to each open application as needed, reducing low-memory messages and eliminating RAM fragmentation. Users can adjust preferences through the included control panel, and the software provides a warning light as the user approaches memory limits. 2MB min. memory; requires System 7. $129. Jump Development Group, 412/681-2692; fax 412/681-2692.

QuickCode Pro

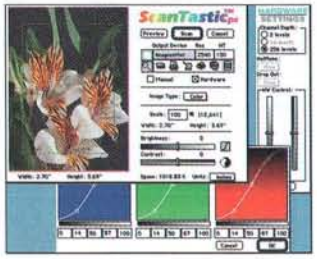
Developing for ACI US's 4th Dimension can be a grinding, heart-bursting task—why make it any harder than it has to be? This 4D editing assistant allows users to navigate procedures via the keyboard; automatically add comment lines to code; save and load procedures to text files; check the balance of parentheses, brackets, and quotes; and perform global search-and-replace actions across multiple procedures. $149.95. Natural Intelligence, 617/876-4876, 800/999-4649; fax 617/492-7425.

Sailing Master

"Hoist the mainsail, you lubbers!" This sailboat simulator allows players to race single-handed yachts around triangle courses. The package offers multiple skill levels, optional autopilot and automatic sail-trim, plus unpredictable weather phenomena. The manual includes a series of basic sailing lessons. $64.99. Starboard Software, 313/662-4393; fax 313/662-0425.

ScanTastic ps

The new version of this Adobe Photoshop plug-in module provides direct access to Apple-, HP-, and Epson-compliant color scanners. The package includes ScanTastic ADF, an application that allows you to scan multiple originals from batch-feeder–equipped scanners; the ScanTastic DA, which allows users to access the scanning module from the desktop; and ScanTastic xt, a QuarkXPress XTension. $99. Second Glance, 714/855-2331; fax 714/586-0930.



ScanTastic ps

SimCity 2000

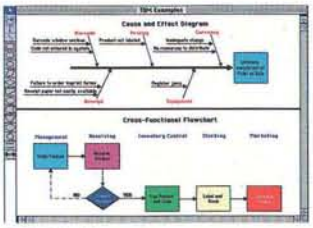
Just when you finished wringing the sweat of the proletariat from your hands, you get a whole new batch of cities to force, coax, nurture, and bully into productive existence. This updated version of SimCity includes new graphics, terrain, structures, futuristic power sources, and futuristic problems for overworked city planners. 4MB min. memory; requires 256-color Mac II. $69.95. Maxis Software, 510/254-9700, 800/336-2947; fax 510/253-3736.

TFLX 5.0

Why should your Mac just sit there while you do all the work? With a hardware-software package like this one, your Mac could be answering the phone, delivering faxes on demand, and taking messages. New enhancements for this release include 22kHz voice recording and the ability to differentiate between incoming fax, data, or voice signals, eliminating the need for an external hardware switch. Base system includes hardware to handle both touch-tone selection and voice input. Extension modules (sold separately) provide automated attendant capability and allow access to and logical searches on databases. 2MB min. memory. $495 to $1750, depending on included modules. Magnum Software Corp., 818/700-0510; fax 818/701-5459.

TQM Toolkit

All the snazzy groupware in the world won't help a disorganized organization. This package helps users diagram and analyze systems design, processes, and work flow through flowcharts. The software features extensive graphic flowcharting tools, custom symbols, text importing and searching, and support for publish and subscribe. $325. Kaetron Software Corp., 713/298-1500, 800/938-8900; fax 713/298-2520.



TQM Toolkit

Trees & Leaves

Let nature be your canvas with this pack of Brush Looks for Fractal Design's Painter and Sketcher programs. These brushes interact with the programs' tools to produce ferns, clover, ivy, or other vegetation patterns. You can use the brushes as backgrounds, or on an existing image to create a three-dimensional surface. $29.95. Fractal Design Corp., 408/688-8800; fax 408/688-8836.

CD-ROMS

Aware Speed-of-Sound Library Volume 1: SFX

We got sound, sound, and more sound. This disc contains over seven hours of MPEG-encoded, stereo sound effects in several sampling rates, resolutions, and output formats. The built-in BrowsFX software provides search, audition, and

Spine

The s-shaped curve of your spine needs support when you sit at your computer or else the strain of poor

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retrieve functions. Purchase price includes license to use all of the sounds in your productions. $249. Aware, 617/577-1700, 800/292-7346; fax 617/577-1710.

Dracula Unleashed
If you're chewing your nails waiting for Anne Rice's next monster novel, you might want to check out this interactive horror movie. Players are transported back to Victorian London, where they have five game days to identify and destroy Dracula before he gives the main character the famous two-holed neck-hickey. The game features 96 minutes of 15-fps color video scattered across 135 scenes. $79.95. Icom Simulations, 708/520-4440, 800/877-4266; fax 708/459-3418.

How Computers Work
For many, the Mac is a mysterious platinum box: the data goes in and the data comes out, but no one really understands what happens in between. This disc uses QuickTime movies to illustrate basic computer concepts such as how a mouse works, what goes on inside a CPU, and the evolution of modern computers. 4MB min. memory; requires 13-inch monitor. $79.99. Warner New Media, 818/955-9999, 800/593-6334; fax 818/955-6499.

QuickTime: The CD
This disc features the winners of the 1993 International QuickTime Film Festival. Categories include animation, documentary, music, narrative, and humor. Nearly 1GB of footage. 4MB min. memory; requires 13-inch monitor, 8-bit color or gray-scale. $49.95. Sumeria, 415/904-0800, 800/478-6374; fax 415/904-0888.

ACCESSORIES

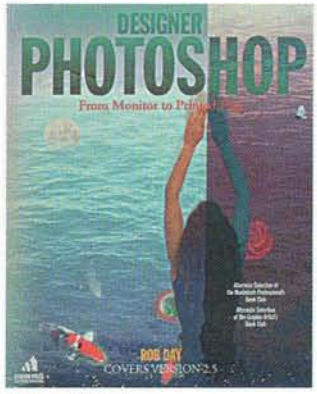
Enduro Cartridge
This laser-printer cartridge could cut down on how many times the little low-toner LED lights up on your printer. The cartridge fits all Canon SX–based laser printers (such as the Hewlett-Packard LaserJet II and III, the Apple LaserWriter, and the Canon LBP-8 series) and features a high-capacity toner bin, a long-life drum, and high-quality toner. $99. Coastal Laser Products, 714/758-1197, 800/432-1628; fax 714/752-5811.

Screenies
If you've got color icons, a color backdrop, a tweaked Finder, and you're still bored, these monitor frames add another level of customization. You can surround your 9- to 17-inch screen with astronauts or abstract designs; even the red edge of an Etch-a-Sketch. The frames mount on Velcro tabs for easy removal when you just can't handle the wackiness. $11.95. Screenies, 707/939-6060; no fax.

SIMM Remover
This plastic tool slides in between a 30-pin SIMM and its mounting brackets to simplify replacing those pesky (and delicate) memory cards. $12.99. Stratos Product Development Group, 206/448-1388; fax 206/448-7830.

BOOKS

Designer Photoshop
This artist-friendly guide to digital design covers resolution; monitor calibration; RGB-to-CMYK conversions; techniques for canning, masks, and montages; virtual memory; undocumented Photoshop tips; and prepress information. Written by Rob Day. 250 pages. $30. Random House Electronic Publishing, 212/572-2600, 800/733-3000; no fax.



Designer Photoshop

The Presentation Design Book
The second edition of this book features a new section on multimedia in addition to guidelines for designing slides, overheads, and handouts. Presenters learn how to use sound, animation, and interactivity in presentations without sacrificing clarity. The book discusses how to analyze your audience and environment, deals with color and typeface selection, and outlines hardware and software requirements. Written by Margaret Y. Rabb. 330 pages. $24.95. Ventana Press, 919/942-0220, 800/743-5369; fax 919/942-1140.

The Underground Guide to Laser Printers
You may never look at your laser printer the same way again. This book details hundreds of tips and tricks on repairs, maintenance, upgrades, and inexpensive supplies, and describes how to produce negatives, overheads, separations, and iron-on transfers. The editors of *Flash Magazine*, a laser printer newsletter, have compiled articles from the last four years to create this book. 176 pages. $12. Peachpit Press, 510/548-4393, 800/283-9444; fax 510/548-5991. **m**

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.

posture could hurt your back, so work smart with our comfortable, adjustable back rest.

Back Rest

ergodyne WorkSmart
software for your hardware 1-800-323-0052

Circle 183 on reader service card

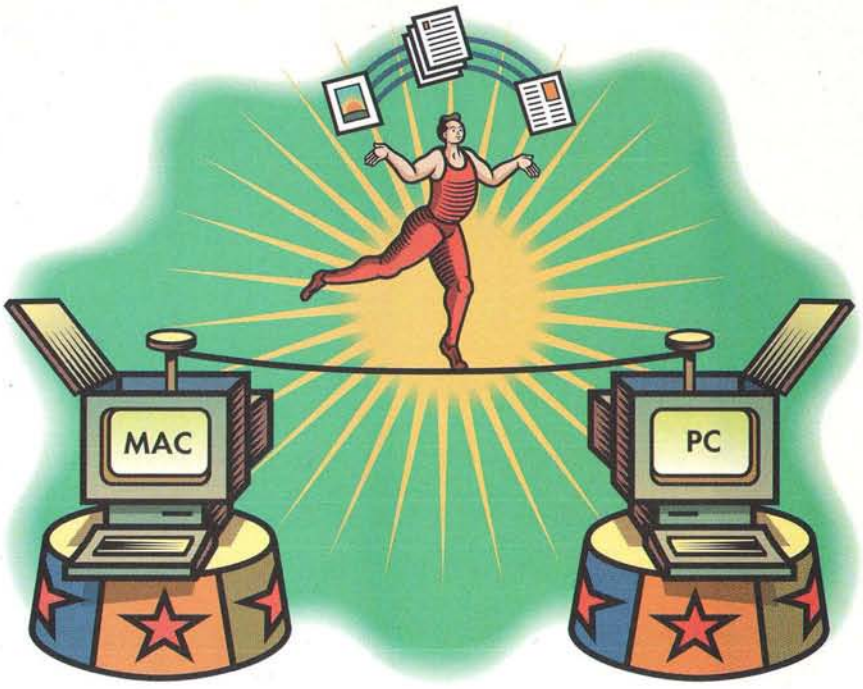
Reviews

Acrobat Exchange; Acrobat Distiller

Document-Interchange System

PROS: Complete, well-planned paperless-office system. **CONS:** Complex documents require Distiller rather than Exchange; reaching tech support can be difficult; problems with non-PostScript applications. **COMPANY:** Adobe Systems (415/961-4400). **LIST PRICE:** Acrobat Exchange $195; Personal Distiller $695; Network Distiller $2495.

MW ★★★



PETER HOEY

IT ALL SEEMS SO SIMPLE. EVERYTHING you see on a Mac screen is just a set of pixels. Everything you print is just a collection of dots. In principle it should be easy to create a scheme in which you could view any document that someone else has created, with just Acrobat's Viewer and without the creating application.

Unfortunately, it's harder than it looks. Adobe's Acrobat software (and Common Ground, reviewed in this issue) enables you to print your document to a special type of file using a Chooser-level driver and then view that file on a Mac screen or print it. Because of the ingenuity Mac developers have hidden in their applications, making this happen without problems is a major software feat. Also, as Adobe and everyone else has realized, document-interchange software becomes much more usable if you can search and select text rather than merely gaze wistfully at bitmaps, so additional cleverness was needed for this task.

Say, Can You See?

The basic Acrobat software for making a viewable file and reading it is Adobe Acrobat Exchange. The Exchange approach is that you create, for example, a four-page company newsletter in Aldus PageMaker, turn the newsletter into an Acrobat file with Exchange's PDFWriter (these files resolutely follow DOS-style file-extension conventions; for example, NAME.pdf for portable document format), and then send it out to your colleagues in the company over a network. At the viewing end, both Mac and Windows users use Exchange to see your document exactly as you created it, without their own copies of PageMaker, and they can print it locally if they can't restrain their forest-destructive urges.

Besides viewing capabilities, Acrobat is packed with amenities, some of them expected and some quite surprising. You can select text and then copy and paste it into a word processing document, although you lose formatting information (copying tables from a document is quite frustrating). You can search text for keywords, and the search process runs at about the same speed as a search in Microsoft Word. The search facility, remarkably, is quite adept at finding text hidden in graphics as well as in plain paragraphs. You can't edit text in a PDF document, but you can attach notes for comments.

Three additional thoughtful features make the Acrobat system the choice for large-scale, office-wide paper elimination.

Bookmarks let you keep track of your place in long documents or, if you are the sender, point out passages of interest to viewers. You can view thumbnail pictures of the pages in a narrow window at the left side of the screen (you can toggle this window off for a full-page view)—in practice the thumbnails and bookmarks help you skip to the important parts of a document first. Finally, a unique Link feature creates hot spots in text; a typical Link application lets viewers jump from text to an explanatory graphic in the same

document. In the Acrobat system you could, for example, create product documentation that would actually be preferable to printed documentation (Adobe has in fact done so with Exchange and Distiller—hard-copy documentation is limited to a few reference cards).

Future Imperfect

The paperless office obviously has a big future, but parts of that future in Acrobat aren't yet as inexpensive or convenient as you might wish. In testing, I confirmed Adobe's caution that you should use the significantly more expensive program Distiller instead of Exchange when you need encapsulated PostScript file (EPS) output. With some applications, Distiller also gives better high-resolution print output than PDFWriter.

If you want to distribute documents with complex color artwork or color photos, you're also going to need Distiller to get workable file sizes. (Distiller reduced a 2MB EPS file with assorted color graphs to 90K.) For documents viewed on screen, Distiller's combination of both subsampling and JPEG compression gives outstanding results. The PSPrinter driver provided in the Distiller package also seems more robust than PDFWriter. Although both drivers work well with PageMaker, QuarkXPress, and any program from Adobe, as you move away from programs that are PostScript-aware, things can get strange.

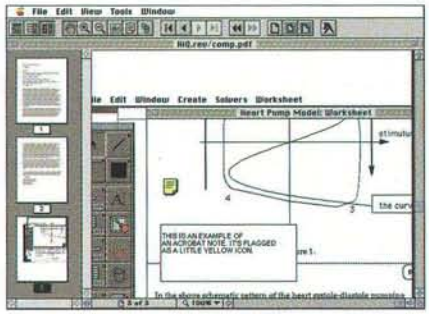
In Excel 4.0, for example, PDFWriter sometimes overwrote part of the Excel tool bar with a command set. In converting the math programs HiQ and Theorist, PDFWriter produced anomalous documents with extra characters in the PDF document. Adobe clearly tested Acrobat with the applications it expected would be used for document production, namely, word processors, draw and paint programs, and page-layout programs. On a large assortment of these, both Exchange and Distiller worked well, although the PSPrinter-and-Distiller combination is the choice if you have gradients or EPS image files. If, in contrast, you expect to use Acrobat to distribute engineering or other specialized-application documents, you can then also expect to spend some time explaining your applications at length to Acrobat customer support and doing some interactive debugging. A realistic Acrobat implementation calls for a 12MB Mac, given the likely size of the document-creating applications and Exchange's own size, and I had better luck printing on PostScript than on QuickDraw printers. Acrobat Distiller also takes charge of your fonts on installation, putting offending fonts in a separate folder; it's unlikely that you'll use these fonts again unless you abandon Acrobat. This is an Adobe product, and it's not TrueType-friendly.

Will It Fly?

Although they would seem to compete, offering some of the same services, it happens that Common Ground and Acrobat aren't really competitors. If you have a single-user Mac and want to send out some documents to a variety of potential viewers, get Common Ground, create Common Ground documents with the Mini-Viewer attached, and send 'em. It works, it's simple.

If you're making up a 20-page hardware catalog in QuarkXPress with a color picture on every page, or an online employee manual, or an instructional booklet with hypertext links, you need Acrobat. Acrobat file sizes—even files created with PDFWriter—are about half the size of the application-based originals, and Distiller's array of squeezing tricks is awesome. In a medium- to large-size company—where someone has day-to-day responsibility for document production, printed or paperless—bringing the system into conformance with Adobe discipline shouldn't be a problem. Only Acrobat, specifically Acrobat Distiller, makes application-independent viewable files from large documents that can be conveniently distributed on a network. That makes Acrobat the current best bet for serious enterprise-wide paper reduction.

The main premise of paperlessness, that people will find 72-dpi screen images a satisfactory substitute for 300-to-1200-dpi hard copy, is probably true for a variety of special applications. On-screen color looks better than most color-printer output, and documents in which searching and copying are necessary are naturals for Acrobat. If you're in charge of document distribution in a corporation, you should at least get some copies of Acrobat Exchange and start experimenting.—CHARLES SEITER



Tacked on Acrobat Exchange lets you distribute notes throughout a document, while protecting the original text. The left side of this figure shows the thumbnail display of the pages in a PDF document.

CoSA After Effects 1.1

QuickTime Movie Editor

PROS: Professional-level video resolutions and interlaced field rates; hefty collection of special effects and color-mapping options; permits multiple key frames throughout an effect; renders in the background. **CONS:** Cumbersome sequencing options; no zoom controls in time line; expensive. **COMPANY:** CoSA (401/831-2672). **LIST PRICE:** $1295.

MW ★★★★

COSA AFTER EFFECTS IS THE ADOBE Photoshop of moving imagery. It blurs the boundaries between animation and traditional video editing by enabling you to apply special effects to time-based media and send logos and other still images flying through space. Certainly I could say the same thing about other QuickTime movie editors. VideoFusion briefly reigned as the best QuickTime effects coordinator on the block. Adobe Premiere offers a small suite of filtering capabilities, though special effects are not its strong point. But only After Effects supplies frame-accurate editing options, editable effects transitions, and the ability to mix an unlimited number of movie and sound tracks at a time. Burdened by inadequate sequencing controls and a hefty price—twice that of either VideoFusion or Premiere—After Effects is not necessarily the first choice for casual moviemakers. Nevertheless, it alone provides a sufficient amount of control and flexibility to satisfy the needs of serious QuickTime enthusiasts and video professionals alike.

QuickTime Pro

Like VideoFusion and Premiere, After Effects revolves around QuickTime. While it imports PICT images, PICS animations, and AIFF sounds, After Effects outputs exclusively to QuickTime. Premiere supports additional formats; VideoFusion lacks support for PICS.

QuickTime has one principal limitation—playback. On most Macintoshes you can't play a movie larger than 320 by 240 pixels without it moving like Frankenstein's monster on low voltage. You can enhance and accelerate playback using products such as SuperMac's DigitalFilm and RasterOps' MoviePak. To bypass playback limitations entirely, professionals can record individual frames

continues

to tape using high-end device controllers such as Diaquest's Animaq and Ensemble Designs' InMotion.

With After Effects, you can prepare QuickTime movies for any final output, with frame sizes as large as 4000 by 4000 pixels. It renders the QuickTime movies at rates as high as 60 fields per second (that's two interlaced fields for each of 30 frames per second). By contrast, neither VideoFusion nor Premiere compensates for interlaced video, nor do they offer the resolution available with After Effects.

The Time-Line Grind

After Effects' interface departs significantly from the QuickTime editing norm. On one hand, After Effects is uniquely cumbersome, lacking even a single predefined transition effect. On the other hand, the program is also extremely versatile, permitting you to begin or end any detail, however subtle, of any effect, however complex, at an exact frame.

To create a movie in After Effects, you import source items—images, sounds, movies—into a Project window, much as in Premiere. You sequence source items by advancing to the frame at which you want the source item to begin and dragging the item into the Composition window, which represents the physical boundaries of your finished movie. Each item resides on an independent layer, and you can mix as many items as you want within a single frame. But rather than displaying layers all at once in a multitiered time line, as Premiere does, After Effects lets you view and edit only one layer at a time; that means you have to do a lot of checking and memorizing to keep track of what is going on. In fact, CoSA recommends that you use Premiere to sequence and mix video clips and then use After Effects to apply additional manipulations.

After Effects' time line also lacks a zoom control; the time line is always 5 inches wide, regardless of the length of your final movie. If the movie is short, the time line provides a relative wealth of detail—for example, a single pixel on screen translates to a single frame in the movie. But if the movie is much longer than a couple of minutes, everything gets so scrunched together that you have to rely entirely on the numerical readouts to gauge an item's position and duration.

Some Assembly Required

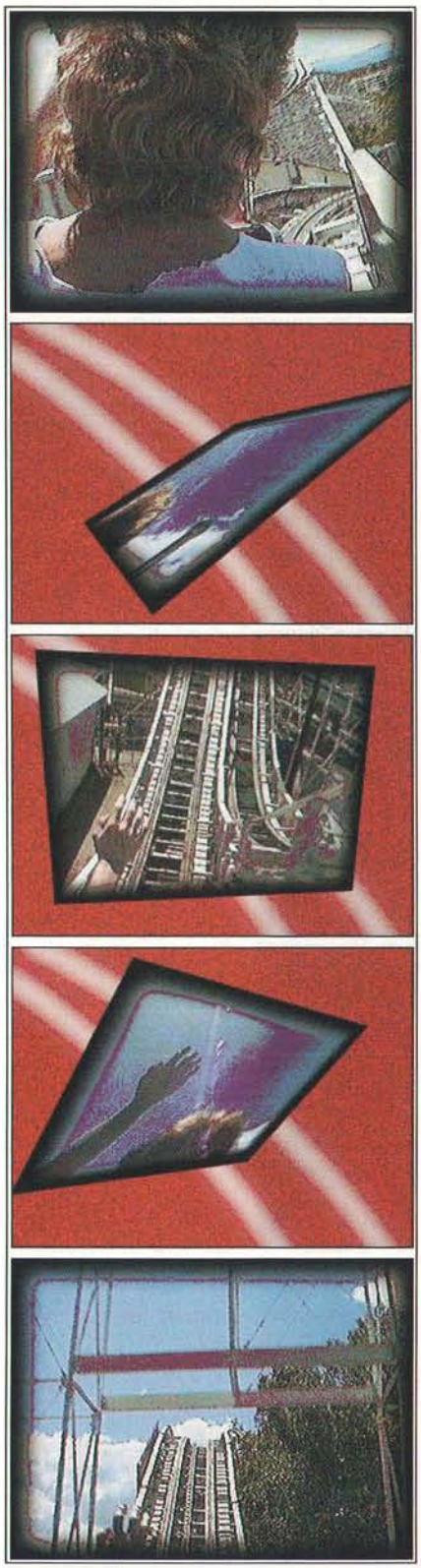
But After Effects yields at least as many *oohs* and *ahs* as it does irritations. Like VideoFusion, After Effects lets you transform and filter video images incrementally over time. In addition to moving, scaling, and rotating video frames, you can crop them inside rectangles, ellipses, or polygons. You can also make an image translucent and even feather the edges to create gradual transitions between different source items or between a source item and a stationary backdrop. Residing in the filter library are the usual sharpen, blur, emboss, and distort effects, as well as a comprehensive supply of color-mapping options that are bound to keep you enthralled whether your goal is color correction or psychedelic effects.

What finally sets After Effects apart from the rest of the movie-effects programs is its key-frame–based editing scheme. You can specify and manipulate multiple key frames throughout an effect, something neither Premiere nor VideoFusion allows you to do. After Effects automatically interpolates transitional frames between the key frames, enabling you to create custom fades and design downright spectacular effects (see "Key-Frame Coaster"). You can even use the program for mundane pursuits like compensating for camera jiggle. After Effects further provides precise control over the method of interpolation. The program can perform direct linear interpolations between one key frame and the next, can smooth out transitions according to spline curves, and can slow the rate of change at the key frames themselves.

The complexity of After Effects' functions rules out previewing a QuickTime movie in real time, as you can in Premiere, so it can be difficult for inexperienced users to accurately predict movement. However, you can examine individual frames at one of three quality settings, from wire-frame (which substitutes a big *X* for each image) to full antialiasing. At the highest resolution, a single frame can take several minutes to display, and the full rendering process takes forever. While you can expect Premiere to render a 3-minute movie in around 15 minutes, an effects-laden After Effects movie of the same length might take close to 15 hours, more in keeping with a three-dimensional drawing or animation program. Thankfully, you can render in the background while using other Mac applications under System 7. I rendered without incident for several hours while writing this review and performing a variety of other tasks.

Like Photoshop, After Effects will benefit from forthcoming DSP technology. In the meantime, you'll need patience to put up with the program's time-consuming rendering cycles. But the results are well worth the wait, the kind of stuff you simply can't create in any competing QuickTime application.

—DEKE McCLELLAND



Key-Frame Coaster Each image here represents a key frame in a movie of a roller-coaster ride flying through video space, thanks to After Effects' Perspective filter. After Effects interpolates between the key frames to complete the movie. Recorded at 320 by 240 pixels at 30 frames per second, this 30-second sequence took roughly 2 hours (8 seconds per frame) to render. That's about the speed you'd expect from an image editor.

OrangePC

DOS Coprocessor

PROS: Runs DOS or Windows programs on Macs; shares files between Macs and DOS PCs. **CONS:** Jerky mouse movement; limited cut-and-paste across platforms. **COMPANY:** Orange Micro (714/779-2772). **LIST PRICE:** With 486SLC processor and 2MB of RAM $1799 (other configurations available).

MW ★★★

ALTHOUGH MORE COMPANIES ARE accepting the Macintosh as a supported computing platform, it can still be difficult to be a Macintosh user in a primarily DOS environment, especially if your company has either off-the-shelf or in-house software that runs only on DOS or Windows PCs. In an attempt to solve that problem, Orange Micro's OrangePC boards let users have their Mac and use a PC too.

The OrangePC boards are real DOS computers on a NuBus board. The newest version uses Cyrix Corporation's 25MHz 486SLC processor, a clone of Intel Corporation's 80486SX processor. There are also two versions based on Intel's 25MHz 80386SX processor, one of which includes serial and parallel ports. The 486 version is aimed at Windows users (but Windows is not included); the 386 versions are for DOS-only users.

The OrangePC boards use the Mac's video circuitry and monitor for display, and they intercept the mouse so they can emulate a DOS mouse, but otherwise they use no Mac resources. This means that you don't have to worry about upgrading your Mac to a 68040-based model to run the OrangePC boards, as you must with Insignia Solutions' SoftPC with Windows emulation software. It also means that you get true 486SX (or 386) performance, as the "How Fast Is Windows on a Mac?" speed rankings show. Because the boards are actual DOS computers, program compatibility is not a problem. The boards also have four standard 30-pin RAM slots, so you can add up to 16MB of RAM.

The OrangePC software handles the disk partitioning on your Macintosh's hard drive to set up the DOS C and (if you choose) D drives. What's nice is that you can have multiple drives on a Mac, handy if you have multiple users each wanting his or her own setup. Of course, each simulated DOS drive takes up space on the Mac's hard disk.

The software does its job adequately, but some compromises have been made to let the two operating systems coexist. For example, OrangePC doesn't let you use the F-keys on a Mac's extended keyboard to correspond to a DOS computer's F-keys; instead, you must assign the function keys a ⌘-numeral combination, such as ⌘-1 for F1. This is necessary because the Mac is active, and those keys mean something to the Macintosh Operating System. Likewise, you can't use the Mac's ⌘ key in place of DOS's Ctrl key. I found that I caused errors when I used ⌘-C and ⌘-V instead of Ctrl-C and Ctrl-V to copy and paste in Windows, since the Mac reacted as if the commands were intended for it.

I also found the program's emulation of a Windows mouse to be uneven. The mouse moves across the screen jerkily at times, without the smooth control that a real Windows mouse (or Mac mouse) has. It's also easy to forget whether you're in PC or Mac mouse mode (despite the different pointer colors), and you can't set up OrangePC so that the cursor changes from Windows to Mac as you move across the screen, as Farallon Computing's Timbuktu remote-control software does (see *Reviews*, March 1993).

The biggest limitation comes into play when you try to share data via the Mac and Windows clipboards. You can copy and paste text from Mac to DOS or from Mac to Windows, but in the other direction, you can cut and paste only from DOS to Mac. If you copy text from Windows, the Mac sees it as a graphic. You cannot copy graphics from the Mac to DOS or Windows, and copying graphics to the Mac is limited to bitmaps (essentially, screen shots of what you highlight).

Fortunately, you can set up shared drives that both a Mac and OrangePC can access; the only limitation is that all files must follow the standard DOS naming structure. Although seamless cut-and-paste would be great, the truth is that you're more likely to exchange whole files rather than cut and paste pieces. The shared-drive feature comes with version 2.0 of the OrangePC software; this was released in June, so if you bought an OrangePC board before then (it started shipping in March), make sure you get the free upgrade. Another way to exchange files is by adding a network board to the OrangePC board (there's a slot for one half-size 16-bit or 8-bit ISA PC board, which covers most products on the market today).

OrangePC also lets you print from Windows to a printer on the Mac network. The OrangePC software takes the print file generated by Windows and sends it to the printer selected in the Mac's Chooser; the default is to do this 30 seconds after Windows has finished processing the print job, but you can reset the print delay or let the jobs spool until you decide you want to batch-print them. I was pleased that I could use Windows TrueType and PostScript fonts not available on the Mac network's printers. You can also connect a printer directly to the OrangePC board.

Technical support was adequate but understaffed. During the period I called, only one technician was handling calls on the 486 board, so I had to play telephone tag to get help.

Putting a PC in your Mac is more convenient than having two computers on your desk. And a real PC works at a rate that lets you do real work, unlike a DOS or Windows emulator. OrangePC is a good idea that is fairly well executed. And its price is comparable to the cost of an actual desktop PC.—GALEN GRUMAN

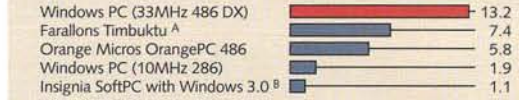
MW LAB How Fast Is Windows on a Mac?

Performance Ranking

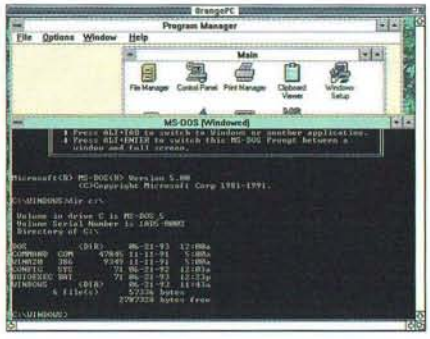
Fastest result in test. Products are in order of overall performance.

We timed typical business tasks in several applications that let us measure a system's overall speed. Results are in times as fast as a Classic.

Longer bars are better.



A Running on a Centris 610 with 12MB of RAM.
B Running on a Quadra 950 with 16MB of RAM.



Two Computers in One Orange Micro's OrangePC board adds a real Windows PC to your Mac. This NuBus board gives you a two-in-one computer that runs Windows speedily, does not affect your Mac's performance, and lets you move data between the Mac and the PC.

Coolscan's color sensitivity, optical definition and low $2300* price tag have already made it the standard of quality and value in desktop film scanners.

Of course, we could name a million more great reasons why you should buy Coolscan™. But we'll keep it short and simple, since Coolscan is a simple tool to use, whether you're using a Mac or a PC. In fact, all you have to do is insert a 35mm slide or negative filmstrip. Select a true resolution up to 2700 dpi. And the scanner does the rest.

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So if you want scans that look like a million for just a couple of thousand, now you know how to get them. With Coolscan. For the location of your nearest Nikon Coolscan dealer, or for a brochure, call 1-800-52-NIKON or (516) 547-4355.

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Nikon
ELECTRONIC IMAGING

Circle 186 on reader service card

Working Model 1.0

Motion Simulator

PROS: Well-designed interface; easy to learn and use. **CONS:** Requires understanding of math and physics. **COMPANY:** Knowledge Revolution (415/553-8153). **LIST PRICE:** $995; educational version $495.

MW ★★★★

WANT TO SEE HOW MECHANICAL components interact or how physical objects move in relation to each other? Working Model is a simulation program that mimics the motion of real objects by applying physical laws.

Unlike conventional animators that move graphic objects where and when you tell them to—with little regard for plausibility—Working Model calculates the interaction of forces on an object, animates the result, and provides data readouts of the experiment, making it useful in applications ranging from animation to mechanical engineering to accident reconstruction and analysis.

Models are built from object primitives and an assortment of special-purpose tools that link and separate objects, apply force vectors, and impose constraints on the motion of objects. There are tools for producing slots, pivot points, various types of joints, springs, ropes, rods, pulleys, motion dampers, actuators, and even motors.

The Smart Editor verifies that changes to the model do not violate previously implemented constraints, and maintains the integrity of linked objects so they move as articulated units. Tugging the hand of a model arm moves the entire assembly according to its motion constraints.

Working Model can also set independent objects in motion and resolve collisions. It can customize gravitational fields, it offers two different methods of calculating air resistance, and it produces force fields that can simulate effects such as wind.

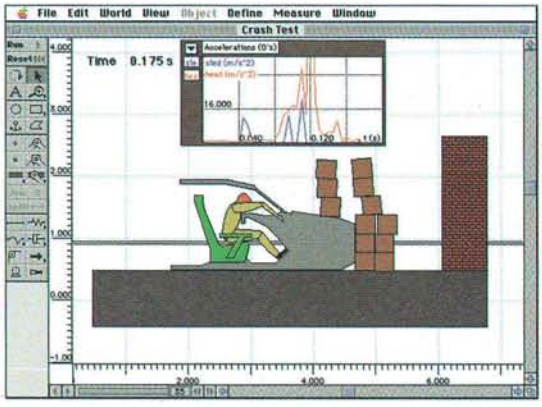
Working Model's Simulation Engine solves the equations of Newtonian mechanics using a mathematical process known as integration. The Simulation Engine derives an object's position and velocity from its acceleration at any moment in time, predicts a new position and velocity, and checks the accuracy of its prediction at each time-step. Working Model offers three integration options. Euler integration is the fastest; the Predictor-Corrector double-checks results; and Runge-Kutta 4, which checks four times, is the slowest and the most accurate. You can customize time-step intervals to suit the experiment. More time-steps will increase the accuracy but also slow down the program.

At any time you can run simulations to test model development incrementally. Floating palettes let you control the attributes of all model elements. Editable properties for objects include mass, weight, moment of inertia, and even material composition.

You can attach slider, button, or numerical-entry controls to any element of a model. These interactive controls let you easily change values and test different scenarios. For example, you can adjust the tension on a spring or alter an object's weight to check the effect on the model. The context-sensitive New Control command displays the controlling options appropriate for each object.

In addition, Working Model's built-in formula language lets you create inputs that describe variable conditions. For example, the changing dynamics of a racing car as it consumes fuel can be simulated by using formulas, rather than specific values, as the inputs for the car's weight and mass properties.

Customizable meters can be attached to any object, point, or constraint in the model. These meters collect and display data as numerical readouts, line graphs, or bar charts. Possible measurements include velocity, acceleration, angular momentum, friction, torque, and air resistance. Working Model can communicate with other programs through Apple events, using its controls and meters as input and output devices. Real-world data can be fed directly to controls, and metered data can go straight to your spreadsheet for analysis.



Complex and Accurate Working Model can build complex motion-simulations and animate the results. Its meters provide accurate measurements.

The built-in graphics tools included in Working Model are suitable for making basic drawings of design components, but I wouldn't recommend these tools for complex constructions. To produce better-looking components, you can paste PICT images from the Clipboard onto mass objects, but for more intricate models, you will be better off using an illustration or CAD program. However, Working Model only imports 2-D DXF format. Expanding file-import capabilities to include PICT and EPS, which would allow users to draw components in draw and illustration programs, would be an improvement.

The options for export are better. The data collected by meters, as well as the positional information for objects, can be exported as tab-delimited text. Both single images and animations may be exported in DXF, PICT, PICS, QuickTime, Macromedia Three-D, and Wavefront formats.

Working Model's time-steps are imported as frames by animation packages. However, because Working Model is a 2-D program, it only outputs *x,y* positional information and a third coordinate describing rotation. So models sent to a 3-D animator will still be flat, lack *z*-axis positional data, and have only one-third of the rotational data the 3-D package expects. The solution is to use the exported model as a pattern for building objects in the 3-D program that use the motion information derived from Working Model's experiments.

A well-implemented interface and clearly written documentation make Working Model easy to learn and use, but you do need to have some background in math and physics. Finally, consider its system requirements (68020 processor, 4MB of RAM, System 7.0) as an absolute minimum. For complex simulations or to utilize 8-bit color you'll need more RAM. Eight megabytes are a comfortable starting point. And you'll do well to give it the fastest Mac you can afford.

Working Model is a terrific program. Not so long ago, you needed a mainframe to run simulations like these. And you couldn't see the results, only printouts filled with numbers. Engineers and designers will love Working Model for what the program can do for them. Inquisitive laypersons will just love it.

—CARLOS DOMINGO MARTINEZ

The **NEW** under *$1000* TI microWriter PS23 is the best value in laser-quality PostScript printers.

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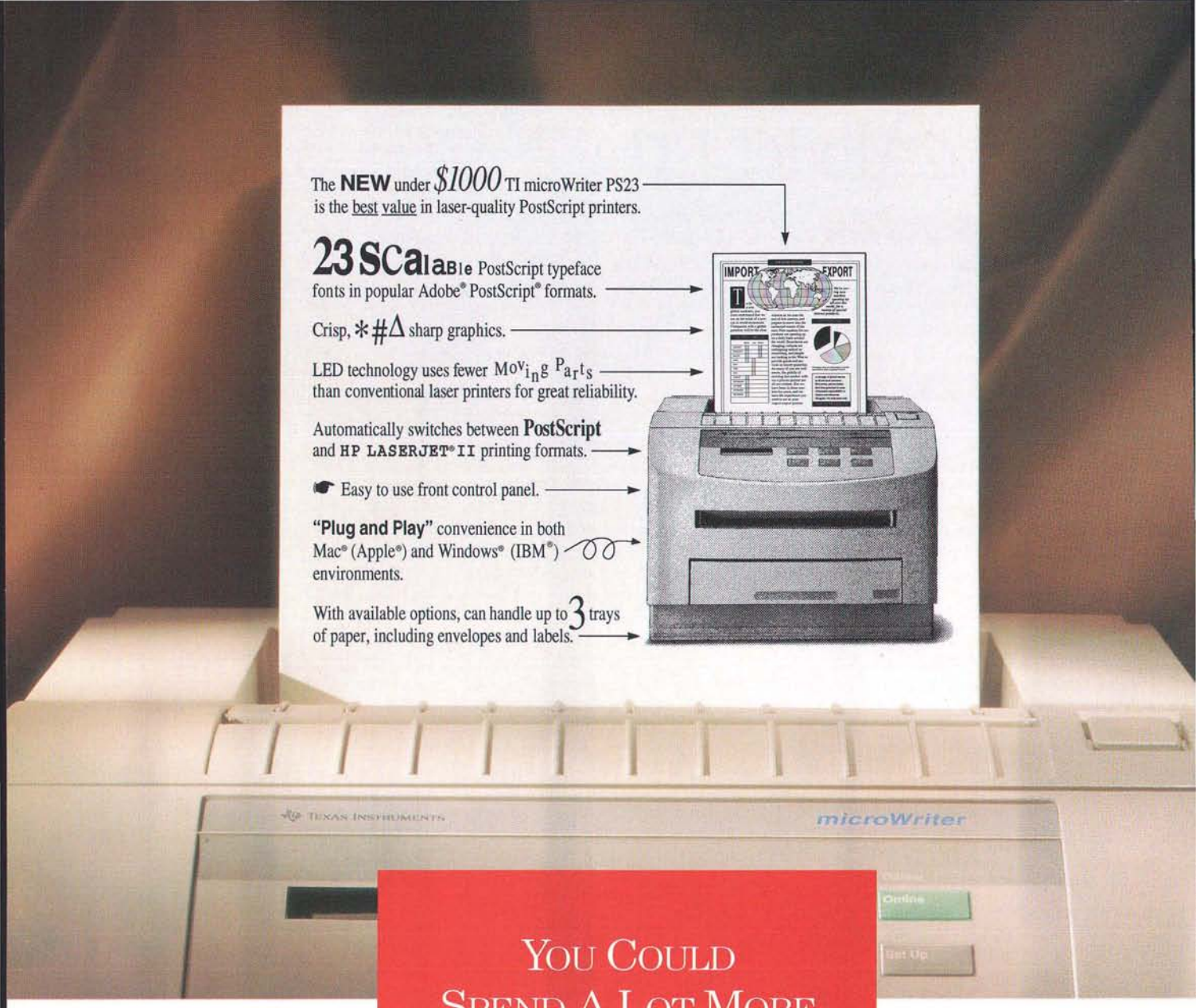

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PC WORLD BEST BUY

POSTSCRIPT Software From Adobe

Circle 80 on reader service card

Common Ground 1.0

Document Interchange System

PROS: Simple; robust; effective security system; no cost for attaching MiniViewer to documents. **CONS:** File sizes similar to those in original applications. **COMPANY:** No Hands Software (415/321-7340). **LIST PRICE:** $189.95.

MW ★★★★

LET'S SUPPOSE THAT YOU WANT TO create documents in various applications and distribute them. You might want, for example, to run up a four-page newsletter with columns and pictures in a page-layout program and send it out to readers who only have Performas running ClarisWorks. You might want to create a complex instructional document and distribute it in a school's Mac lab in which all the Macs have different software but not necessarily the document's creator application. Or perhaps you need to produce a database report for distribution to field salespeople, who may not want to keep the actual database application on their PowerBooks.

For these cases, Common Ground is nearly an ideal product. You simply drag your document over the Common Ground Automaker icon, and the program produces a universally readable (and printable) version of the document with the file extension .dp. (You do this if you're sending the file to users who have Common Ground themselves or the freely distributed MiniViewer.) Alternatively, you can use the Chooser-level driver CG Maker to create the new document, and select more options (attach MiniViewer, opt for lower-resolution printed output for some file-size savings, specify viewing at 640 by 400 resolution for PowerBooks or Classics). In either case, it's a simple process, and it works. I tested documents from 20 different applications, and Common Ground processed all of them with no complaints; the resulting files viewed with the Common Ground Reader were all faithful to the originals. Probably because this technology (the program captures and processes QuickDraw printer instructions) was debugged several years ago as DiskPaper at Farallon Computing—now called Digital Paper by No Hands Software—the program never complained or crashed. Note, however, that Common Ground files are similar in size to the original documents, which makes it awkward for processing and distributing large files with complex color artwork.

Common Ground has a variety of nice features beyond display, assuming you are reading a file with the Reader and not the MiniViewer. You can search for text (see "Seek and Ye Shall Find") and copy it to a word processor and copy images to PICT files; both of these copying functions can be disabled with a security setting, and the whole file can be encrypted with a password. Multizone documents (those with columns or rows) can be partitioned into sections for precise selection; font data and other document information can be called up with a keystroke; keyboard shortcuts are available for nearly all operations; and the online help is particularly well organized.

In its current state Common Ground is not up to the task of creating electronic magazines in color, and it can't print at better than 300-dpi resolution. For enterprise-wide, large-document tasks, you should resign yourself to the additional expense and occasional inconvenience of Adobe Acrobat, mainly because Acrobat has solved many file-size problems for complex files. For modest document-distribution jobs, however, Common Ground is the clear choice. A MiniViewer for Windows was also distributed in August, and according to the company the Windows version of Common Ground is scheduled to ship in November, making Common Ground more useful in mixed-platform environments. No Hands Software is offering a product that, within its limitations, is an admirably cost-effective and easy-to-use Mac tool.

—CHARLES SEITER

Seek and Ye Shall Find Common Ground documents allow text searching—in this example the program has found the word *company* embedded in a gradient fill. The section tool (the little palette of horizontal and vertical bars) is used to define zones for selecting text.

Power Team 1.0

Personal Information Manager

PROS: Excellent data entry features; unique calculator function; fast import and export. **CONS:** Requires at least 3MB of drive space; some bugs. **COMPANY:** ProVue Development Corporation (714/892-8199). **LIST PRICE:** $149.95.

MW ★★★

POWER TEAM IS THE NEWEST ENTRY in the PIM (personal information manager) field and is worth a try. In addition to the usual address and calendar features, Power Team adds financial and correspondence modules.

Power Team consists of seven modules: Phone Book, Calendar, Correspondence, Checkbook, Calculator, Expense Report, and Mailing List. The Phone Book includes address and phone data; you can dial phone numbers via the Mac speaker or a modem. After you dial, Power Team automatically makes an entry in the phone log. The Calendar includes a to-do list and alarms for reminders. The Correspondence module, used to write letters and create envelopes, is linked to the Phone Book module, so to start a new letter, you first locate the recipient in the Phone Book, choose the New Letter command, and the program opens a new letter that's addressed and ready for you to begin writing. You can also search old correspondence by recipient or by any word used in the letters. The Mailing List module is a subset of the Phone Book, omitting the phone fields.

The Checkbook module is a simple electronic check register similar to Quicken from Intuit. You can have a total of 12 checking, savings, or credit card accounts. You can split a transaction into 7 expense categories. You can reconcile your accounts and print checks, profit-and-loss reports, and income-and-expense reports. The Expense Report module includes a form for reimbursable expenses, and you can track which expenses have been reimbursed.

The Calculator, besides doing numeric calculations, can convert between measurement systems, such as temperatures, liquid and dry weights, volumes, areas, and distances. It can also calculate loan payments and elapsed time between two dates in years, weeks, and days.

Power Team has many features to make data entry easier. Chief among

continues

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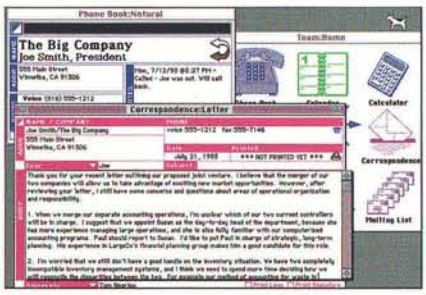
them is Clairvoyance, which completes your typing in fields that have repetitive entries. For example, after I've entered several Los Angeles addresses, when I type the letters *los* in the city field, Clairvoyance fills in the words *Los Angeles*. If I keep typing, say, to enter *Los Gatos* instead, the new entry erases the Clairvoyant guess. Other aids include automatic capitalization, intelligent recognition of dates and time, and automatic lookup of the city when you enter a zip code. Natural Addresses lets you enter the complete address in one field; Power Team then automatically splits the address into street address, city, state, and zip code fields.

Power Team imports and exports text files to and from all of its modules. Importing a 1000-record test database into the Phone Book took less than 10 seconds.

I found a few bugs in Power Team that need to be addressed. The close box on the Analysis window sometimes didn't work when I was switching between Analysis and Chart windows in the Checkbook module. Attempting to cancel while the program was dialing the phone made the Phone Book freeze.

The Power Team manual includes a tutorial with sample files that ship with the package and a reference section. The tutorial is fine for someone just getting started, but the reference section needs to be expanded. There should also be information on how to clear the example files of sample data so you can enter your own information. And other topics, such as printing onto special-size forms, get short shrift.

Power Team addresses most of the areas you need to be organized—people, money, and correspondence—and does it with a well-thought-out, easy-to-use package. Personal information managers tend to be, well, personal, and you should check out Power Team to see if it fits your style of working.—TOM NEGRINO



Easy Letters Power Team's Correspondence module makes it easy to write letters to people in your Phone Book. Here, I've whipped out a boilerplate letter with text copied from another letter in the file. Total time to create was under a minute, and it was ready to print.

Kodak ColorSense 1.0

Color-Management System

PROS: Easy to use; good results; batch processing and Photoshop plug-in save time. **CONS:** Hardware copy-protection scheme; doesn't make color separations. **COMPANY:** Eastman Kodak (716/253-0740). **LIST PRICE:** $499.

MW ★★★

COLORSENSE IS DEDICATED TO THE proposition that a color original, a scan of that original displayed on any monitor, and all printouts made from that scan, should look the same. The package has three main components: a monitor-calibration device; a set of device profiles that characterize the color abilities of popular printers, monitors, and scanners; and software that corrects images automatically or lets users make their own adjustments.

To use ColorSense, you first calibrate your monitor and scanner. The monitor calibrator attaches to the screen via a suction cup and measures the brightness values of color patches generated by the ColorSense software. By comparing the measured values to the program-supplied ones, ColorSense creates a file that describes the ways your monitor deviates from the norm. To calibrate a scanner, you simply scan the gray-scale step-chart that comes with ColorSense and then tell the software to analyze the scan. As with monitor-calibration data, the information derived from scanner calibration is used to customize a generic device profile so that it accurately reflects the performance of your particular device.

Once you've customized your device profiles, you can use them to correct images or to preview what an image will look like when output to a given device. For example, as you open a scan file in the ColorSense program, you can simultaneously correct that file by applying your scanner's device profile to it. The software takes stock of your scanner's various problems and neutralizes them. When you display the file on screen, the software makes a second adjustment to produce an accurate display on the currently selected monitor. When you print, you tell the software which printer you're using, and it applies corrections as needed for that device. The scan file itself remains unchanged through these operations—unless you save the corrections.

I tried ColorSense with a Sharp JX-300 scanner and a CalComp ColorMaster printer. I was impressed by the scan corrections. On some images, the software did a better job of removing color casts than I could have done in Adobe Photoshop with considerable effort. When I wasn't satisfied with the automatic corrections, I easily tweaked them by using the Modify feature. While ColorSense also improved the CalComp's output considerably, the printouts weren't as satisfactory as the corrected screen images. ColorSense includes no scheme for printer calibration; you must rely solely on the generic printer profiles.

I tried calibrating multiple Apple 13-inch monitors to see if I could make an image look the same on different computers. ColorSense eliminated brightness and contrast differences admirably, and got rid of about 60 percent of color differences among monitors.

Modify Tool The Modify tool lets you easily adjust images by picking from a range of variations. Modify shows variations for contrast, brightness, and hue.

My biggest criticism is that the software is hardware-protected. It simply won't run—and your monitor calibration won't be activated—unless the screen-calibration device is connected. Another criticism may have been addressed by the time you read this: when this was written, the roster of ColorSense device profiles was small. If you're interested in ColorSense, make sure Kodak offers profiles for all the machines you use.

ColorSense isn't for prepress professionals or designers who require exact color matches. The package doesn't produce color separations, and its automatic corrections will never rival those produced by skilled operators. But ColorSense does give average users access to a reasonable level of color consistency at a reasonable price. If you're a multimedia producer who'd like to standardize your screen (to the degree standardization is possible), or a designer who'd like better comps from a printer or Fiery copier, or someone who scans a lot of images and doesn't want to spend time correcting them individually, ColorSense will be a big help.—JOE MATAZZONI

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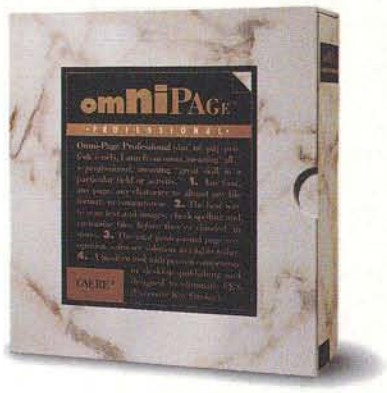

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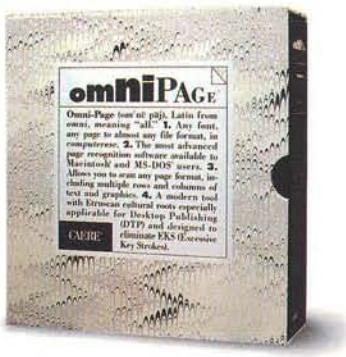

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Stacker for Macintosh 1.0.1

Driver-Lever Compression

PROS: Transparent diskwide compression of all of your data. **CONS:** Hard drive performance slows 20 to 65 percent; problems handling full disks; not compatible with driver-level security programs and some hard drive formatters; virtual memory not recommended. **COMPANY:** Stac Electronics (619/431-7474). **LIST PRICE:** $149.

MW ★★

IF THE FREE SPACE ON YOUR HARD DISK is shrinking faster than you can remove obsolete files, compression may be an ideal way to reclaim some space. Stacker for Macintosh is a driver-level compression product, so it works with a hard disk driver to compress and expand data as it is written to and read from the hard disk.

Before compressing a hard disk, Stacker checks the integrity of the data on the disk. Depending on the disk size, installation can take 45 minutes or longer. Although installation is preceded by a stern warning to back up data, you can install Stacker without having to reformat, which should leave your existing data intact. The operation concludes by telling you how much space has been added.

Removing Stacker is a similarly lengthy process. If the files that have been added to the drive can't be contained when the drive is no longer compressed, the Stacker application warns you about how much data you need to remove. If there is enough space, removing Stacker leaves the data intact—but Stacker once again warns you to have a backup handy in case something goes wrong.

There's no provision to update Stacker when a new version comes along. You have to remove it and install the new one. I ran across this situation during the course of this review, when Stac sent *Macworld* a maintenance update shortly before the review process was complete. According to the Read Me file, this update adds a search for bad blocks to Stacker's integrity-checking process.

Although the listed capacity of a drive compressed with Stacker doubles, the figures are inaccurate. When I installed Stacker onto a drive with existing data, the reported amount of space taken by the files increased by 10 to 25 percent. Rather than the promised 2:1 compression ratio, the ratios Stacker could muster over several installations ranged from 1.54:1 to 1.69:1.

Stacker's impact on performance depends on your Mac. With my fully outfitted Quadra 800, there was little delay in reading data from the disk or in launching applications (although writing to the disk slowed to less than 45 percent of the speed of an uncompressed drive). On a PowerBook 180 Stacker slows application launching 10 to 25 percent. Writing files took about 2½ times as long as with an uncompressed drive. You can expect proportionately worse performance on slower Mac CPUs.

In addition to being incompatible with driver-level security software, some hard disk formatters, and even Central Point's MacTools DiskFix, Stacker isn't friendly to virtual memory. The slowdown caused by compressing and expanding data as it's moved in and out of a virtual swap file pretty much make this feature unusable on a "Stacked" drive.

The biggest weakness in driver-level compression software up to now, though, has been its inability to cope with full disks without damaging data. For the most part, Stacker dealt with a nearly full drive with aplomb, until I forced the issue by using Norton Encrypt on files on a nearly full drive compressed with Stacker. Two quick encryption and decryption processes (which add and remove resources from files, thereby changing the amount of compression that can be applied) damaged several large files beyond repair.

On another occasion, I attempted to remove Stacker from a hard drive after several files had been corrupted. Stacker reported that there were unspecified problems with the drive, claimed to have fixed the problems, then locked up. Upon restart, the drive was locked, although I was able to retrieve most of the files without further apparent damage. Attempts to repair the drive using Stacker's Check function were not successful. Conventional hard drive repair utilities reported that repairs couldn't be made. Stac's technical support suggested I use a utility that was supposedly available on the company's bulletin board service. After a careful search failed to locate it, I gave up and reformatted the drive.

Despite these unpleasant episodes, I lost very little data, and then only when I tried hard to stretch a full disk. If you pay attention to the capacity of your hard drive, Stacker performs reasonably well, except for its slow hard-drive read quotient. But many of the file-level compression products that work during the Mac's idle time perform as well as or better than Stacker, without the risk of trashing your files.—GENE STEINBERG

BrushStrokes 1.0

Color Paint Program

PROS: Straightforward interface; good documentation. **CONS:** Relatively expensive; lacks virtual memory; insufficient antialiasing. **COMPANY:** Claris Clear Choice (408/727-8227). **LIST PRICE:** $139.

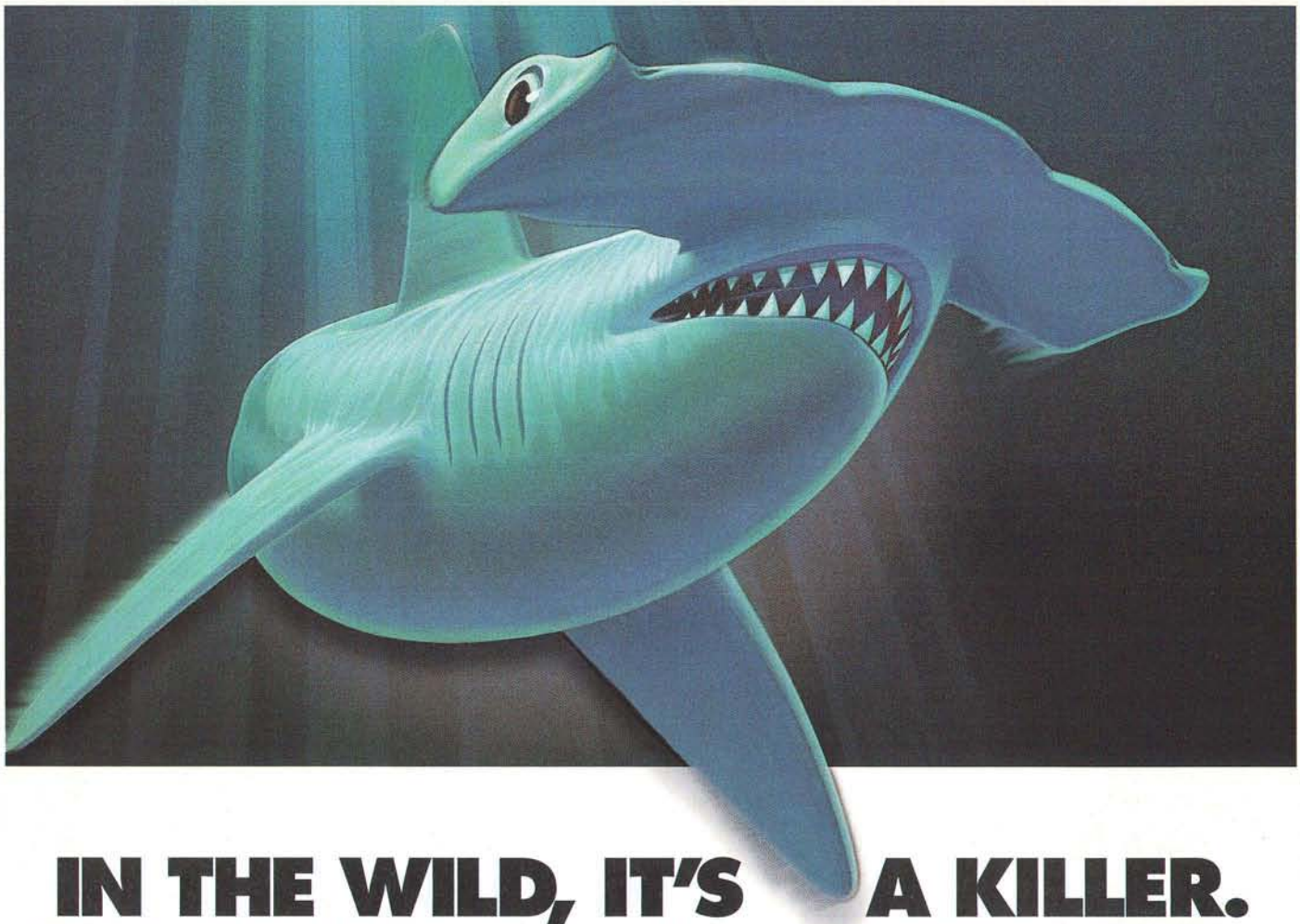
MW ★★

BRUSHSTROKES IS THE FIRST PAINT program to come from Claris since MacPaint 2.0 in 1987. While BrushStrokes is clearly better than MacPaint, it doesn't fare nearly so well when compared with its full-color peers. For example, BrushStrokes lacks the capacity for virtual memory, a cardinal sin among full-color paint programs. As a result, you can't open any image that won't fit entirely into RAM. So if your Mac has 4MB of RAM, of which you assign 3MB to BrushStrokes—I'm assuming the best-case scenario here—you won't even be able to create a full-color image that fills a 13-inch screen at 72 dots per inch. Meanwhile, at least ten other paint programs—three of which are less expensive than BrushStrokes—let you borrow space from the hard drive so you can create large images that will print more smoothly and incorporate far more detail.

Another of BrushStrokes' problems is antialiasing, a common painting function that slightly blurs the edges of image elements to soften color transitions and eliminate jags. BrushStrokes antialiases the edges of letters and geometric shapes, but it drops the ball in the creation of, well, brush strokes. Most paint programs let you paint soft lines using just about any painting tool but the pencil. Two of BrushStrokes' painting tools offer specific

continues

Harsh Reality Most BrushStrokes functions result in hard edges. Compare, for example, the smooth color transitions inside the scan of the camel with the jagged lines in the upper-right corner.



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options (if you can find them) to approximate antialiasing by painting translucent dollops of color. This unusual approach helps downplay the harsh edges, but it does not soften color transitions to the same extent as in more capable programs. Compared with the antialiasing capacity of the $50 Expert Color Paint—the least expensive paint program on the market—BrushStrokes just doesn't measure up.

BrushStrokes is not without merit. It offers a reasonable collection of special-effects capabilities, the sort of tools and options you expect at this price. You can blur and sharpen the focus of an image, for example, but you can't specify the extent of the blurring or sharpening. You can also smear colors, create gradations, and paint translucent brush strokes, functions common in the 24-bit arena. BrushStrokes provides a masking function for protecting portions of an image, but, like the paint tools, the mask is hard-edged, affording no smooth transitions.

BrushStrokes forges a modicum of identity in the interface and learning departments. You can select any tool by pressing a key on the keyboard. Furthermore, you can store tools and their settings in a custom palette, enabling you to switch between settings without entering dialog boxes and reselecting options. Along with thorough online help and full-color documentation, BrushStrokes ships with a well-organized tutorial for the novice painter. The images in the tutorial are rudimentary and, in some cases, just plain scary—kids with enormous saucers for eyes and inflamed blisters for cheeks—but it's all in the name of explaining some useful techniques.

BrushStrokes' pluses would be more impressive if I weren't talking about paint programs. Not even feature kings like Fractal Design Painter and Adobe Photoshop equal the complexity of other varieties of graphics software. A simplified interface, extensive online help, and full-color documentation do little to enhance the value of this product. The trick is to provide a wealth of features without burdening the interface or swelling the price tag. In these respects, BrushStrokes misses the mark. Its features run neck and neck with those of Delta Tao's Color MacCheese and Zedcor's DeskPaint. By contrast, Expert Software's Expert Color Paint can be had for a third of the price and is superior in key respects. And Color It is in another league.

If you have absolutely no experience with computer graphics, BrushStrokes' simplified interface might warrant its price. Otherwise, you can find better programs with smaller entry fees.

—DEKE McCLELLAND

Market Master Manager 3.5

Sales-Automation Software

PROS: Automated generation of letters and follow-ups; includes remote module for sales reps in the field. **CONS:** Some odd user-interface features; built-in letter-writing features are limited; slow at building long lists. **COMPANY:** Breakthrough Productions (916/265-0911). **LIST PRICE:** $595.

MW ★★★

MARKET MASTER MANAGER IS designed to keep track of sales contacts, generate mailings, and make sure that sales leads don't fall through the cracks (or become buried somewhere on your desk). The program uses a plan-based approach that allows you to take each of your sales leads step-by-step through a sales plan.

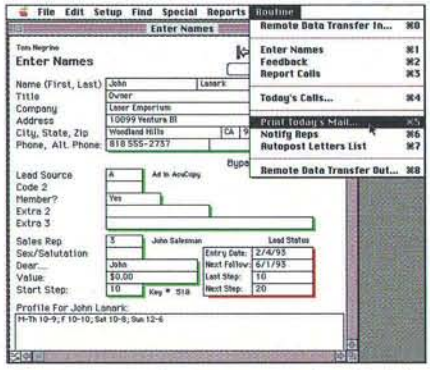
Depending on the number of steps in your sales process, setting up a sales plan can be quick and simple or an involved project that requires several hours. To design the sales plan, you break down the actions you take to make a sale into discrete steps. Each step has one or more possible outcomes; in response to each outcome, the plan branches to the appropriate later step. You can even have the program automatically notify you to contact a particular customer if you have had no response after a specified number of days (up to 999 days).

Once the plan is established, the day-to-day use of the program is easy. Through the Routine menu, you enter new leads, enter the response to the last sales step, bring up a list of all of the calls you need to make today, and enter responses to those calls after they are complete (see "It's Routine"). You can print all of the letters, envelopes, and mailing labels that are scheduled for the day with a single command. The leads progress through the plan based on the responses, called Feedback, you enter. If there are sales reps in the field, you can use Market Master's Notify Reps command to print a report for your sales reps detailing which letters have been sent; this lets the reps update the customer's history with the appropriate information.

Market Master allows you to create simple one-page letters (in 12-point Times only). If you need more-complex letters, you can set up mail merge export templates for most popular word processors except WordPerfect. The company includes a sequence for CE Software's QuicKeys[2] to help automate the export and merge process, but it's still a bit clunky. Most of Market Master's sales-automation competitors now include a built-in word processor.

Market Master's negatives include a confusing menu structure and nonstandard ⌘-*key* equivalents (⌘-Q doesn't quit, it finds the first record in the database). The company plans to improve the ⌘-*key* structure in the next release. A revamping and simplification of the menu structure would be helpful, especially for new users. Market Master is written in Double Helix, and database queries can become annoyingly slow—ten seconds or more—as the customer list grows past 1000 names.

Market Master Remote, included with Market Master, allows a two-way exchange of data between sales reps in the field and the home office. Market Master Remote can't print sales letters; it is limited to data entry and just enough of the automation features to enter Feedback, move a lead from one sales plan step to the next, and upload data files with changes. Data files containing the changes can be sent back and forth via E-mail, AppleTalk Remote Access, or floppy disk. To update Market Master, the home office first loads the data files from the field reps. The home office prints letters triggered by Feedback and sends new data files and client histories back to the field reps.



It's Routine The Routine menu lists all of the most common Market Master actions, in order from top to bottom. Here, I've just corrected the address of one of my sales leads, and I'm about to print the day's queued letters.

Market Master's approach is best suited for salespeople who generate a lot of letters and direct mail; it's not as strong for telemarketers. Market Master makes it easy for an assistant to produce daily correspondence, freeing the sales rep to spend more time on the phone or with customers.—TOM NEGRINO

"I DON'T NEED (tick) YOUR DATA (tick) PROTECTION SOFTWARE (tick). I'VE HAD MY MAC (tick) FOR YEARS AND (tick) IT HASN'T CRASHED (tick) YET."

Not to alarm you or anything. But if a lot of wishful thinking is all that's standing between you and a Mac meltdown, you may want to check out a more proven method of protection.

We suggest the Norton Utilities for Macintosh v2.0. It both prevents data loss and gives you the most effective data recovery features available. In other words, it's like giving your computer its own personal bomb squad.

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CA-Cricket Draw III 2.0

Draw Program

PROS: Improved EPS export; bound-text capabilities second only to Illustrator's; versatile blend tool; stalwart color-separation options. **CONS:** Bound text is not automatically kerned; can't edit extruded objects; can't interrupt screen display. **COMPANY:** Computer Associates International (516/342-5224). **LIST PRICE:** $249.

MW ★★★

NO ONE WILL ACCUSE CA-CRICKET Draw III of inspiring Mac artists to jump up and down. But the features are abundant, the interface is straightforward and functional, and the price is right.

Version 2.0 successfully addresses a couple of inadequacies of its predecessor. First, it generates more serviceable EPS documents. Version 1.0 used to save complete mathematical definitions of a drawing in the PICT screen preview, thus slowing the display of an EPS illustration imported into Aldus PageMaker or QuarkXPress to an excruciating crawl. Version 2.0 gives you the option of saving a color or black-and-white bitmapped preview, which dramatically speeds up the screen-redraw process.

Second, as in Adobe Illustrator, Draw III now offers a bound-text tool for creating and editing text directly on a path. As in Aldus FreeHand, you can now control the orientation of individual characters so they rotate with the path or remain upright at all times. You can also reposition the point on the path at which the text begins and change the direction of the path to ensure that text flows from left to right. Most important, you can read text on a path without first printing it.

However, Draw III 2.0 lacks the ability to automatically kern text on a path, a splendid function version 1.0 shared with Illustrator and Deneba's Canvas. When you bind text to a free-form path in version 2.0, the text spreads out along the straightaways and bunches up in the valleys and at transition points, making for a strange and wholly unacceptable effect that requires manual kerning.

Version 2.0 offers an extrusion tool for making objects appear three-dimensional. Unlike with similar tools in other draw programs, you can apply Draw III's extrude tool to an object multiple times, in effect extruding objects that are already extruded. Unfortunately, you can't edit an extruded object by dragging a single face as you can in Canvas and Aldus IntelliDraw. Instead, you have to ungroup the object and edit it one face at a time.

Other new capabilities are a spelling checker and thesaurus, a Text to Outlines command so you can create logos and special headlines, and a blend tool for generating intermediate shapes between two objects. Version 2.0's blend tool lets you create custom transitions according to a Bézier-curve model. For example, suppose you are blending a rectangle to an ellipse. The blend might accelerate toward the ellipse, rush back to the rectangle, and then ebb gently to the ellipse again, all according to your exact specifications. You have to drag away several handles and points before you gain access to the beginning of the blend, but it is a surprisingly flexible tool.

Draw III offers enhanced printing capabilities, most notably support for spot- and process-color separations. The separation functions include automatic crop marks and registration targets, support for specialized PostScript printer definitions (PPDs), and control over halftone screen angles and frequencies. Version 2.0 doesn't match Illustrator's Separator utility for flexibility and functionality, but it's more than I expected.

Certainly, Draw III has its share of problems. You can't interrupt the screen display, made doubly frustrating by the program's sometimes insufferably slow preview mode. Handles sometimes serve no function, such as those on the insertion marker that accompanies bound text. And the program still lacks a snap-to-point function needed to align objects manually. Nevertheless, Draw III 2.0 measures up as the best draw program under $300.—DEKE McCLELLAND

Extrude the Extruded The extrude tool works on objects that are already extruded. Made by applying the tool three times to a rectangle, this object has 216 surfaces and takes over 4 minutes to display on a IIci with accelerated 24-bit video.

eDisk 1.0

Driver-Level Compression Software

PROS: Automatic diskwide compression of all data. **CONS:** Strong potential for file or disk corruption; installation and removal require reinitializing hard disk or removable media; hard drive slows 20 to 50 percent; not compatible with driver-level security programs, virtual memory, some removable-cartridge extensions, and other software; files copied to other disks or sent via modem are expanded automatically. **COMPANY:** Alysis Software Corporation (415/566-2263). **LIST PRICE:** $149.95.

MW ★

DRIVER-LEVEL COMPRESSION SOUNDS practical. Files written to your hard disk are automatically compressed; files read from the hard disk are expanded. Alysis's eDisk holds out the promise (on the back of the box) of simple installation; transparent operation; and compatibility with virtually all existing hard drives, removable devices, and software. But the promise is not easily kept.

The installation instructions require that you back up all of your data before installing (or removing) eDisk, because the program reinitializes your hard disk or removable media while installing itself.

Setup is done from a single window that allows you to install and customize eDisk. You can choose a 2:1 or 4:1 compression rate, but Alysis states that the lower compression factor is the one most compatible with different drive models and software. You can set a "Smart eDisk" function to automatically configure settings, establish a compression ratio, set a delayed write function (where writing data to the disk is delayed until a preset cache is filled or the Mac is idle), and configure the size of the cache (which uses the Mac's installed RAM in an attempt to boost performance). A check box provides for background disk optimizing after a preset period of time. eDisk also includes its own Repair Disk function to check for potential problems.

I installed eDisk on a Quantum 127MB drive and two SyQuest 88MB cartridges, all freshly formatted with FWB's Hard Disk ToolKit 1.3.1 (the latest version as this is written). Disk preparation took less than 15 minutes for each device. I followed Alysis's recommendations about drive settings.

Once things were off and running, I was able to get some informal benchmarks—all done with extensions off, to

continues

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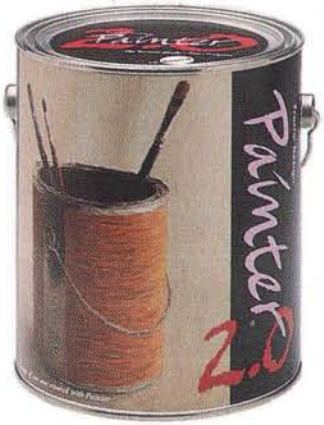

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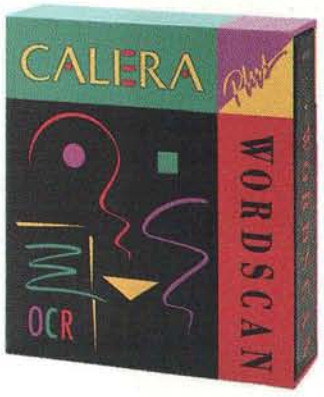

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Circle 169 on reader service card

prevent software conflicts from affecting performance. Applications launched with a delay—up to a 30 percent delay for those that depend on a number of support files to run. Read-write performance was from 20 to 50 percent slower, as was start-up speed. Turning off Delayed Writes lengthened the write to disk by an order of 200 to 300 percent. Rather than doubling drive capacity, my improvement was more in the order of 60 to 65 percent increased capacity (though the amount depends on the kind of data compressed).

My first experiences with eDisk were nothing to write home about. Nearly every restart brought a warning about a write operation being interrupted. With each warning, I attempted to repair the cartridge with eDisk. Finally, I used a commercial repair/recovery utility, and received a warning about volume bitmap damage and the disheartening news that all or most of the files on the cartridge were damaged beyond repair!

I spoke with three technical-support people at Alysis, and the only cause they could suggest was some kind of SCSI conflict. I rechecked cables and termination, changed SCSI ID numbers here and there, and gamely plunged in again, this time formatting a second SyQuest cartridge and expanding it with eDisk.

eDisk fools the Mac's File Manager into showing files in their expanded size, but the figures fluctuate rapidly, and even copying a small file brings huge changes in remaining disk space. With a sharp eye toward the remaining capacity on the second cartridge, I copied several folders from my start-up drive. Even though the data was much smaller in size than the displayed free space, once the files had been copied the cartridge was nearly full. A restart brought a resumption of the "write" error messages, and I let eDisk repair the cartridge. A checkup with a hard drive repair/recovery utility showed that many of the files were cross-linked—that is, they were listed in the same spot on the directory tree. The fastest way out was just to trash the files.

By carefully watching out for eDisk's temperamental nature, I was able to get it to run without further mishap, except for an occasional warning about a write operation being interrupted. But eDisk has little to recommend it over any of the popular file-level idle-time compression programs. These programs are generally faster than eDisk, have no impact on hard drive performance, and can be installed and removed without affecting data. While I hope many of eDisk's shortcomings will be addressed as the software is updated, for now I cannot recommend this product.—GENE STEINBERG

mira 35

35mm Slide Scanner

PROS: Inexpensive; compact; wide range of exposure controls. **CONS:** Color correction in RGB only; trouble resolving fine detail.
COMPANY: Santos Technology (310/320-8888). **LIST PRICE:** $2695.

MW ★★★

IF YOU'VE BEEN BEMOANING THE absence of good desktop transparency scanners, your suffering may be over. The $2695 (list price) mira 35 from Santos Technology measures 7¾ by 4½ by 13¾ inches—about half the size of the average desktop flatbed scanner—and is one of a recent wave of relatively affordable options for digitizing transparencies. Instead of offering adapters to handle a variety of media—reflective art, large-format transparencies, and filmstrips—as some flatbeds do, the mira is an acknowledged one-trick pony. It is designed exclusively for scanning 35mm slides.

This architectural-looking device features an attractively curved front with several rows of small decorative bumps down its center. Directly beneath these bumps is a thin slot, which accommodates the slide. When you start the mira, scanner elements inside provide a dramatic backlight as an unseen mechanism mysteriously draws the slide inside. The effect is very cinematic.

Like most scanners nowadays, the mira 35 operates via a plug-in filter and can be used in conjunction with any image-editing program that supports plug-ins. For publication-quality scans you still need to use a full-fledged image editor. However, the mira 35's software provides far more robust controls than are common with most desktop scanners.

The well-designed interface is divided into three main panels: Resolution/Scaling, Color Balance, and Gamma. All the controls can be set by way of a slider bar or, for greater precision, by numerical entry. A preview mode lets you zoom in on the initial scan and set highlight and shadow points. This makes it possible to precisely match the exposure to the type of image.

The Resolution/Scaling panel enables you to set the scanning resolution from a minimum of 75 dpi to a maximum of 2700 dpi and to scale the image from 25 percent to 200 percent. Between these two adjustments, the mira 35 can capture enough information to reproduce a 35mm slide at 8½ by 11 inches at 150 dpi. Scanning a slide usually takes four to six minutes, depending on resolution.

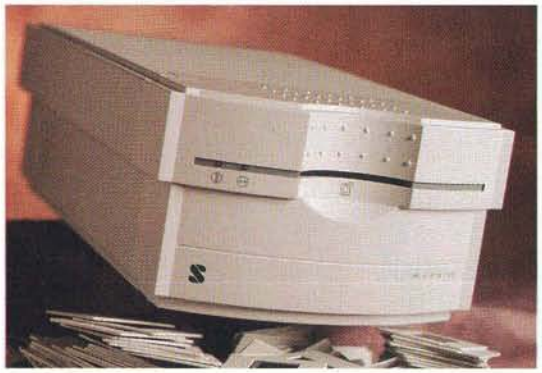
The Color Balance panel allows you to set overall brightness and overall contrast, but you can also adjust brightness for each color channel (red, green, and blue). This is especially handy for neutralizing color casts inherent in certain film types.

The most powerful control set, and also the most complicated, affects the gamma, which is the amount of contrast among the midtones of an image. Gamma controls enable you to make very fine adjustments to the midtones without affecting the highlights and shadows in an image. Like the color-balance controls, the gamma controls let you make overall corrections or adjust each color channel separately. This panel also lets you create or load settings files for resolution, color balance, and gamma to apply to a particular type of film, for example, or to slides with peculiar lighting conditions.

These controls go well beyond the usual for a scanner in this price range. However, the ability to scan and color-correct in CMYK mode would be a welcome addition. If you are scanning for CMYK-process printing, making accurate color corrections in RGB color space is very difficult.

Slide scanners in this price range typically suffer from an inability to resolve extremely fine details, and the mira 35 is no exception. Even so, the mira 35's initial uncorrected scans are quite good, with only a slight red cast, which the plug-in corrects adequately. Scans also need some sharpening, but for this you need more-powerful image-editing software.

The mira 35 puts many sophisticated color-correction tools into a low-cost package. If you have lots of 35mm film lying around that you just can't wait to digitize, the mira 35 is definitely worth a look.
—MATTHEW NIELSEN



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Sum Total 1.01

Calculator Utility

PROS: Feature-packed calculator connects to other applications; useful built-in color calculation; matrix math with complex numbers. **CONS:** Time lag in operations; needs more-complete documentation. **COMPANY:** Concurrent Engineering Tools (602/464-8208). **LIST PRICE:** $99.95.

MW ★★★

SUM TOTAL IS DESCRIBED AS A "MULtipurpose calculator application for the Macintosh," but even this generous description is an understatement.

In standard calculator mode, you can define registers with variable names and print these self-documenting calculations to an on-screen "tape" or save them to a file. GET# and PUT# functions exchange data with other applications; you can sum a column of numbers in a word processor by copying the selected numbers and pasting the result back.

In programmer's calculator mode, Sum Total can handle binary, octal, hex, signed and unsigned integer, and ASCII numbers, and provides all common Boolean operations, bit shifts, and base 2 logs and powers. The binary-number display is a DIP-switch format rather than 0s and 1s—and you can toggle the switches on screen.

The scientific calculator has the complete set of transcendental functions, complex numbers, matrix math, and multivariate statistics with regression analysis. All calculator modes can be invoked with RPN or algebraic notation, and Sum Total is one of the few calculators that recognize operator precedence (that is, 4 + 4*4 is evaluated as 20, not 32).

The really novel calculator mode, however, is color, in which you can sample colors from elsewhere on screen, in RGB, CMY, CMYK, HSB, and HSL color values, and use the numerical color values in calculations. This means that an ordinary color paint program could become an excellent tool for commercial design that mostly involves spot color.

Sum Total is a control panel that can exist on screen as a small palette that stays in place as you switch from one application to another. The price for this convenience is a distinct time-lag in menu operations. When you click on a button there's a delay before the other items pop up, and this delay seems strangely unrelated to the speed of the Mac being used. The calculator itself is remarkably quick, however. It's generally easier, for example, to use Sum Total to do matrix math and swap the results into Excel than to use Excel's matrix functions. There are AppleScript links included in Sum Total, but no commercial applications currently support enough AppleScript functionality to take advantage of these links.

True Colors The Sum Total eyedropper can pick colors from a picture in any application and report the colors' values in any standard color spaces. You can perform computations such as averaging on colors and preview the results.

Unfortunately, this utility has only about 50 pages of documentation. Sum Total's novelties, specifically the color calculator, and advanced features for communicating through AppleScript, call for about three times as much explanation as is given. —CHARLES SEITER

Computer Crayon

Input Device

PROS: Inexpensive; works on most surfaces; easier for kids to grasp than a mouse. **CONS:** Buttons can be hard for very small children to press. **COMPANY:** Appoint (510/463-3003). **LIST PRICE:** $49.

MW ★★★

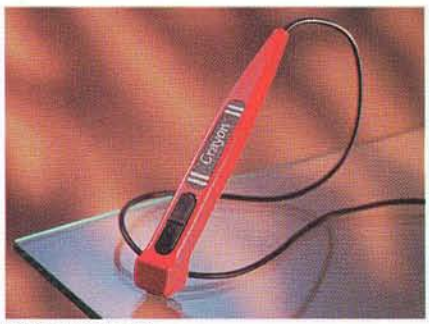
AS AN AGING BABY BOOMER WHO occasionally yearns for the trappings of childhood, I'm convinced that Appoint has hit upon a brilliant marketing idea. When I first heard about the Computer Crayon, images of carefree afternoons spent with a box of Crayolas and a paper pad came to mind; I actually expected Appoint's new input device to resemble an oversize wax crayon.

In reality, the Computer Crayon is almost identical to the MousePen Pro, another mouse replacement from Appoint. Shaped like a thick pencil with an ADB cord at one end and a tiny rolling ball at the other end, the Computer Crayon has two buttons that you operate with your index finger. One works like the button on a standard mouse, while the other button toggles between accelerated and normal mode. (In accelerated mode, rapid hand motions are amplified so the cursor moves around the screen much faster.) The only concessions to the Computer Crayon's namesake are the colored plastic housings, available in red, green, blue, or yellow, and the word *Crayon* printed in large, friendly letters above the buttons.

Like the MousePen, the Computer Crayon works just about anywhere. According to the user documentation, you do not need a mouse pad—in fact, the smooth pad I use at home was the only surface that caused the cursor to stick and jump. The Computer Crayon is one of the few pointing devices that work well on a pant leg, a handy option for those times you're extremely short on space.

Pitched at the artist and kid markets, the Computer Crayon is touted as being ideal for graphics applications. But even though I have always found it cumbersome to draw using a mouse, I did not notice much of an improvement with the Computer Crayon. Serious computer artists will probably opt for the precision of a drawing tablet.

As anyone with kids knows, you can count on children to offer brutally honest opinions, so I enlisted three apprentice reviewers to test the Computer Crayon. My 21-month-old daughter seemed more interested in playing with the Computer Crayon than with the mouse, although pressing the buttons was difficult for her. My nieces, ages 7 and 8, both preferred the Computer Crayon to a standard mouse for doodling, selecting menus, and general fooling around on the Mac. Overall, I would say that the kid contingent's verdict was a definite thumbs-up.



ROBERT PERRY

Computer Crayon

Although I wasn't able to assess its long-term durability, the Computer Crayon seems sturdy enough to withstand abuse. (The cord and ADB connector are probably subject to the greatest wear.) At a street price of about $30, the Computer Crayon is a good choice as a spare input device, especially for use by children.—FRANKLIN N. TESSLER, WITH THANKS TO ALYSSA, DANIELLA, AND LEORA

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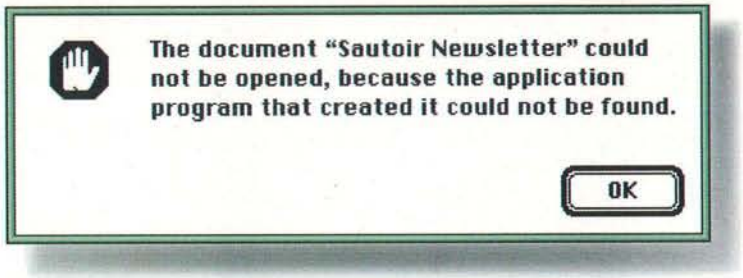

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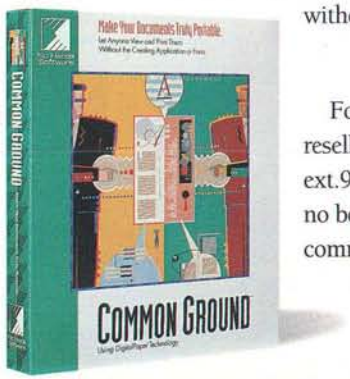

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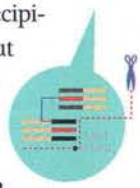

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Macintosh Common Lisp 2.0

Programming Environment

PROS: Includes easily extensible EMACS-like editor; includes good sample code; compatible with CLOS; excellent documentation in manuals and on CD-ROM. **CONS:** Limited interface-construction tool does not include CLIM.
COMPANY: APDA (716/871-6555). **LIST PRICE:** $495.

MW ★★★

LISP WAS DESIGNED TO GIVE THE programmer the freedom to redefine functions and objects on the fly without restarting the computer or recompiling the code. This flexibility is probably the main reason artificial-intelligence researchers love the language.

What began as a simple programming language (the name comes from *list processing*) is now a complete software-development environment with its own standard dialect known as Common Lisp. Common Lisp includes a standard set of object-oriented programming conventions known as CLOS (Common Lisp Object System) and a standard interface system known as CLIM (Common Lisp Interface Manager). Programs written in this standard dialect are highly portable from one platform to another, so that an application written on a Sparcstation or a Hewlett-Packard workstation, for example, should need very few modifications, if any, to run on the Mac. The core of the environment is an EMACS-based text editor (EMACS comes from *editor macros*), which will also probably be familiar to most programmers with a background in Unix or minicomputer-LISP.

Experienced Lisp programmers will like Macintosh Common Lisp 2.0's extensive debugging and interface-building facilities. The interface builder lets you create object-based controls for Macintosh windows, dialog boxes, and menus, while sacrificing only a few of the features of keyboard-based LISP. Marrying two different interface traditions can be difficult or even disastrous, but the designers did a good job with Macintosh Common Lisp.

Another key asset in version 2.0 is the inclusion of CLOS (Common Lisp Object System), the standard object model for object-oriented programming, since this enables users to easily port object-oriented Lisp code developed elsewhere to Macintosh Common Lisp.

Testing code is also very easy with the feature-rich debugger, which enables the user to step through the code, trace the execution, and parse complex data structures. The object inspector displays individual data items in the large structures that are characteristic of Lisp programs.

The new version includes several changes to the underlying structure of the Lisp Interpreter and Compiler to increase compatibility with some of System 7's features, such as virtual memory and Apple events.

When Macintosh Common Lisp first arrived, its interface generator was one of the best in any language. Now products such as AppMaker from Bowers Development Corporation and Marksman from IT Makers have arisen to provide competition. Macintosh Common Lisp's function selection is limited, but it can be extended by modifying the Macintosh Common Lisp source code (included), or by buying either the Common Lisp Interface Manager from Lucid (415/329-8400), or Action, a set of more-sophisticated interface-design tools from ExperTelligence (805/962-2558). Both products list for $495. Despite its lack of ready-made interface facilities, anyone who likes programming in LISP will be pleased with the environment provided by Macintosh Common Lisp and its extensive debugging and interface-building facilities.—PETER WAYNER

CalendarMaker 4.0

Calendar-Making Program

PROS: Useful; straightforward and intuitive; many options; customizable. **CONS:** Some features are cumbersome; slow on older Macs.
COMPANY: CE Software (515/224-1995).
LIST PRICE: $59.95.

MW ★★★★

MAYBE IT ISN'T FAIR, BUT THE FIRST test I apply to software is, Can I make this thing work without consulting the manual? CalendarMaker has a crystal-clear interface and a handsome calendar of the current month that you can start using, and modifying, right away.

To start, you specify what sort of calendar you want: length of view (one month, one week, one day), week style (start and end days), and various other options. Click on OK and your calendar appears, with spacious blanks for each day.

When you type in a day's blank space, a scroll bar appears; if you fill the allotted space, the scroll bar becomes active, so you can add as much text as you like (only the currently visible portion of the text prints, with an overflow indicator to show there's more). When the cursor is on a movable element, such as a note, icon, or event, the cursor becomes a grabber hand for dragging events from one day to another. (You can also use cut, copy, and paste.) Adding repeating events (such as weekly meetings, monthly deadlines, or birthdays) is only a bit more complicated: you set criteria in a Duplicate Event dialog box. CalendarMaker also has Expert Duplicate and Custom Duplicate modes for more-complex repeating events, such as a meeting on the third Friday of all months except January and May. For events that span several days, CalendarMaker provides floating notes that you can easily resize.

The one-day calendar layout has spaces for the hours of the day, with room for appointments and other plans. I found this (as well as the weekly layouts) useful as a supplement to monthly calendars. It would be nice, though, if you could link daily and weekly layouts to a monthly calendar, so you could zoom in on a particular day or week and see it in greater detail.

The basic layout has two boxes for pictures (you can put illustrations in the background, too). CE Software includes a modest assortment of clip art; if you tire of billiard balls, deer, umbrellas, and the like, you can import a PICT image.

You can print your calendar in any size. If you want a huge calendar, the program shows you how many pages it will take and provides crop marks for tiling the pages.

November The purple box is a floating note. CalendarMaker includes ready-made, editable icons, as well as an icon-maker for designing your own.

CE Software clearly knows how to put together a polished, useful product; I rely on the company's QuickMail program for E-mail, and expected (and got) similar quality in CalendarMaker. When I did consult the manual, I found it eminently well written and organized.—FELICITY O'MEARA

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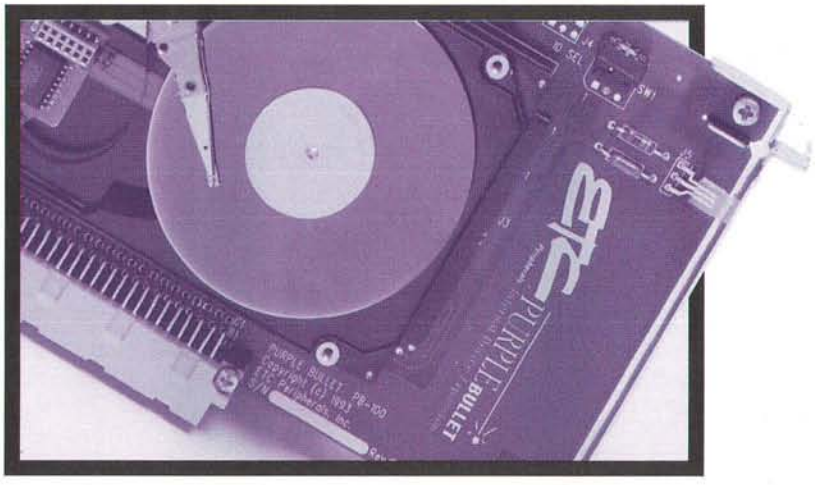

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PowerPacks 2.0

Programmer's Tool Kit for 4D

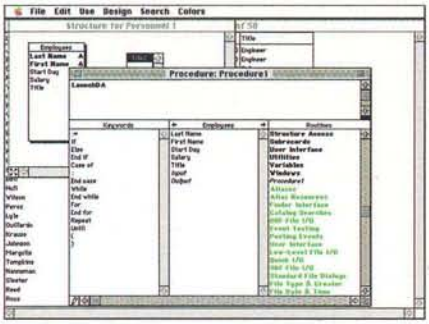
PROS: Powerful set of 4th Dimension externals for low-level machine access plus file and window handling; allows easy access to System 7 features; good documentation and examples. **CONS:** Not much help with 4D performance problems. **COMPANY:** NDG Phoenix (301/718-8880). **LIST PRICE:** $225.

MW ★★★

POWERPACKS, PRODUCED BY RKP Software of Oakton, Virginia, but marketed by NDG Phoenix, a few miles across the Potomac in Bethesda, Maryland, lets you do lots of successful tinkering and repair on the original 4D software. PowerPacks 2.0 provides 280 external procedures for ACI US's 4th Dimension, grouped in 45 categories, that let professional developers improve upon the stock 4D interface in custom applications, exploit System 7 features for user convenience, and generally work around 4D's limited access to hardware.

You install the set of externals directly into the database using 4D's External Mover Plus utility, or into a library Proc.ext file. Rummaging around in the new set of procedures offered by the nine packages in the product, you find many wonders. You can now manipulate aliases inside 4D, read PICT files, open and work with multiple resource files, use System 7's Catalog-Search, adjust window sizing and zooming using information about the display devices available to your application's user, and manage resources directly (just as you might with C or Pascal externals, but PowerPacks makes it easier). Since PowerPacks' System Pack includes access to the System 7 Process Manager, you can now let your programs call desk accessories (see "Hit List"). Your programs can also now manage memory shortages gracefully, avoiding 4D's notorious "Out of memory. Please quit as soon as possible" message. In other words, you can write 4D-based applications that look like real applications written in a traditional programming language. This also means that you can greatly reduce the amount of 4D familiarity a user would need to run your application successfully, expanding your possible range of users.

One mild disappointment with PowerPacks is that it doesn't offer a quick fix for 4D's less-than-blistering performance in most areas, except for improvements in file input and output. In fairness, it must be noted that increased involvement with System 7 has probably never made anything faster, and a tool-kit firm can't be expected to rewrite the 4D search engine. A few parts of PowerPacks have also been superseded by developments in 4D 3.0—you needed these tools, for example, to make closable windows in 4D 2.0, but 3.0 has fixed this. When you buy this package, however, you will find that RKP's customer support has plenty of valuable advice on both speed issues and application design.



Hit List After you install PowerPacks, your set of 4D programming procedures expands (check the green part of the scrolling procedures list) to improve file I/O and get direct access to System 7. For example, you now have Launch DA as a possible 4D procedure.

If you're a professional developer, PowerPacks will save you plenty of development time and make your applications look better, and that represents an unbeatable investment.—CHARLES SEITER

Safe or Sorry 1.0

Text-Recovery Utility

PROS: Unobtrusive background functioning; simple interface. **CONS:** Does not work as advertised; requires System 7.1; few user-customizable options. **COMPANY:** Olduvai Corporation (305/670-1112). **LIST PRICE:** $59.

MW ★★

IF YOU'VE EVER EXPERIENCED A PROgram crash, system crash, or power failure while typing an essential document, then you probably know the frustration that accompanies the realization that your lost typing exists only in your memory. Safe or Sorry is a small, unobtrusive control panel that periodically saves all your keystrokes, helping you recover your work even in the face of a seemingly catastrophic disaster. Or so the story goes.

I loaded the program on my SE and PowerBook 100, set the save frequency to one minute for maximum security, and started working in WriteNow 3.0. Not long afterward, WriteNow crashed when I tried to highlight a word. Undaunted, I restarted my Macintosh and opened that day's Safe or Sorry file. Emboldened by my new recovery program, I had not saved my document for more than ten minutes before the crash. Yet all that typing was nowhere to be found!

Safe or Sorry had simply not performed the promised function. To add insult to injury, I discovered that WriteNow was crashing only when Safe or Sorry was running. After calls to Olduvai's friendly, helpful technical support, I found that Safe or Sorry was not compatible with 68000 machines. (Olduvai fixed this incompatibility with an upgrade to Safe or Sorry 1.01 shortly before we went to press.) It is also incompatible with any System version below 7.1 (despite the manual's inclusion of instructions for installing the program under System 6.0.X).

Safe or Sorry is installed in the Control Panels folder and loads at start-up. In a folder in the Preferences folder, the program creates a file that is a daily record of every keystroke that you execute—no matter what program or window you're working in. Safe or Sorry has a clear interface with a minimal selection of customizable options. These include the ability to record the application name, window name, and time above each section of recorded keystrokes in the recovery file. You can also choose whether or not to have backspaces deleted from the recovery file. You can set the time interval between saves to between 1 and 30 minutes, and Safe or Sorry can delete old text-recovery files at a specified interval between 1 and 60 days. You can also turn off Safe or Sorry for a few seconds by pressing shift-control-delete to protect your passwords and other sensitive data.

On a Centris 650 running System 7.1, Safe or Sorry worked effectively. Still, a few extra features would be most welcome, such as the ability to set your own keyboard combination for temporarily disabling Safe or Sorry and to set how long it stays off. Most important, if users could specify the applications that Safe or Sorry works with, games such as Tetris would not be slowed down and hard drives would not be filled with useless keystrokes.

Safe or Sorry offers no clear-cut advantages when compared with other text-recovery programs, such as Last Resort from Working Software, or when compared with text-recovery features in products such as Now Utilities 4.0 from Now Software and Thunder 7 from Baseline Publishing. Furthermore, based on my experience, the product may not work reliably under all circumstances. While Safe or Sorry requires little user attention, I think that rather than relying on it to save me from disaster, I'll stick with two stalwarts of good computer habits: frequent saves and consistent backups.—CHRISTOPHER ZURN

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Seven Days in August

Interactive CD-ROM Documentary

PROS: Compelling montage of archived photos and sounds; easy-to-navigate; fairly quick-paced format. **CONS:** No motion segments; conflict with some extensions; uses the word *cinemactress*. **COMPANY:** Time Warner Interactive Group (818/955-9999). **LIST PRICE:** $79.99.

MW ★★★★

IN SEVEN DAYS IN AUGUST, THE EDITORS of *Time* attempt to carve a one-week slice from history—August 10 to August 16, 1961—and offer it to viewers in a manner that truly evokes the period. More than just the story of the events leading up to the building of the Berlin Wall (with a brief look at its dismantling in November 1989), the disc offers a glimpse of daily life, both in the United States and in Berlin. Despite a lack of motion sequences and a technical glitch (I had to remove a few extensions before the disc would run properly), the documentary accomplishes its goal admirably.

After a brief introductory tour, Seven Days presents a montage of tinted black-and-white stills culled from *Time*'s extensive archives, backed by tasteful music and commentary. You can explore the contents in a random manner, clicking on photos and using the navigational palettes at the bottom of each screen to move from day to day, or you can uncover the information a bit more methodically by relying on the handy Guidemap.

The Guidemap screen presents a grid with each day along a left-hand column and the main categories in a row along the top. Categories include a news synopsis for each day; profiles of prominent statesmen such as John Kennedy, Nikita Khrushchev, and Willy Brandt; and a roundtable discussion with journalists and politicians. In addition, there are interviews with citizens of both East and West Berlin, as well as Berlin, Wisconsin. The Home Front category highlights topics such as the space race, civil rights, the newly formed Peace Corps, and backyard bomb shelters. An archive contains mediocre maps, the text of *Time* stories of the day, and a few recently declassified government documents.

In a lighter vein, the Souvenirs section offers surveys of early-sixties public opinion (70 percent of Americans thought we should fight our way into Berlin, 66 percent disapproved of women wearing shorts in public), along with comic strips, photos of popular autos, a TV guide, and snippets from best-selling books and popular music. Two games reinforce the gender bias of the time: For the Record tests you on baseball trivia, and First Lady of Fashion lets you dress an electronic Jackie paper doll for state events or a dinner with Frank Sinatra.

Day One Moving the mouse over an image elicits a brief related sound bite; clicking on the image brings up a full-screen photo or series of photos and triggers a longer audio segment.

As mnemonic devices, the Souvenirs and game components may provoke a few memories in oldsters, but the true value of the disc lies in the news and interview components. Future documentary discs may boast larger text banks and full-motion video, but Seven Days works well within the constraints of today's CD-ROM technology.—SUZANNE STEFANAC

Gulliver

Miniature Mouse

PROS: Compact; works on most surfaces. **CONS:** Small size makes mouse hard to hold. **COMPANY:** Appoint (510/463-3003). **LIST PRICE:** $119.

MW ★★

IF YOU'RE LIKE ME, YOUR MOUSE HAS to compete with papers, cups, half-eaten sandwiches, and other clutter for valuable desk space. Trackballs and other stationary pointing devices are one solution for crowded desktops (see "Input Alternatives," *Macworld*, June 1992). Gulliver, a miniature mouse designed for people who don't have enough room for a conventional mouse, is another remedy that may appeal to some.

Gulliver is about one-third smaller than an Apple mouse. (Calling it Lilliputian would have been more faithful to Gulliver's literary origin, but that's another story.) It's available in basic Mac platinum (see photo) and PowerBook gray. The wedge-shape case sports two curved buttons: the larger one at the front acts like a standard mouse button; the other, smaller button toggles between regular and accelerated cursor control. In regular mode, the cursor moves as fast as the mouse; with acceleration turned on, rapid mouse movements are multiplied to make the cursor go even faster, handy for covering great distances on large monitors.

On the plus side, Gulliver incorporates an improved ball that gives you more freedom in your choice of work space than other mice. Unlike conventional mice Gulliver does not rely on gravity to maintain ball contact with the work surface; Gulliver's ball rolls smoothly on just about any surface. Not only are slick mouse pads not necessary with Gulliver, they actually make the cursor jump erratically because they don't provide enough friction. In my trials, Gulliver worked equally well on fabric, plastic, wood, and paper, including the armrest of my office chair and my lap.

In day-to-day use, Gulliver's diminutive size is both a benefit and a handicap. Because Gulliver is so small, you can use it in tight quarters where a full-size mouse might not fit. (Gulliver's ability to work without a mouse pad also helps save space.) On the downside, however, Gulliver's tiny case makes it hard to hold; unless your hand is very small, it's difficult to cradle Gulliver comfortably in your palm the way you can with larger mice. In fact, the package notes suggest that you grasp Gulliver like an artist's chalk, between your thumb and middle finger. When I followed Appoint's suggestion, though, my hand began to ache after about 15 minutes because of the constant muscle tension required.

RICHARD RETHEMEYER

Appoint's Gulliver mouse

I can't recommend Gulliver for routine desktop use, unless space is too tight to accommodate a standard mouse and pad, or unless your hands are smaller than average. But Gulliver is an acceptable alternative if you often need to use your Mac in situations where conventional surfaces aren't available, like with a PowerBook on the go.

—FRANKLIN N. TESSLER

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Musicshop 1.0

MIDI Sequencer

PROS: Combines easy MIDI recording and editing with a standard music notation editing view; permits quantization on batch recording and playback. **CONS:** Notation features extremely limited; additional purchase required for printouts. **COMPANY:** Opcode Systems (415/856-3333). **LIST PRICE:** $149.95.

MW ★★★★

OPCODE SET MAC MIDI SEQUENCING on its ear in 1990 with EZVision, a distilled and somewhat simplified version of Vision, Opcode's $495 professional sequencing product. EZVision lacked some of the advanced controls of its more powerful sibling, but it ably met the needs of many MIDI enthusiasts. Musicshop builds on EZVision's solid success; adds simple notation capabilities; and at $149.95 takes over the entry-level spot in Opcode's line.

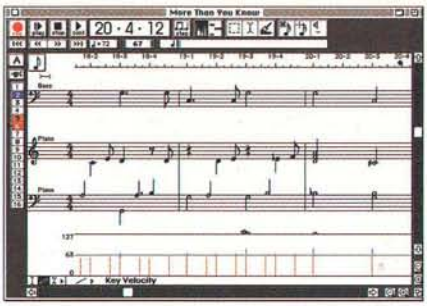
As its manual states in bold italics, "Musicshop is not a music notation application." If you need beaming or stemming, symbols, rehearsal marks, or markings such as accents, you'll need to use a full-blown notation product. Musicshop can't write parts for transposing instruments, which doesn't really matter because it can't extract parts. (In fact, it can't print any high-res scores until you purchase the Sonata printer font from Adobe Systems.) And scrolling in the notation view is slow as syrup.

Still, the notation view serves the purpose it was designed for: to make *editing* your music more convenient. Once you've recorded a song by playing it on your MIDI synthesizer, you can toggle Musicshop's editing window between the piano-roll display familiar to users of other MIDI sequencers and the standard music notation display.

Like EZVision, Musicshop has five windows—the Edit window, Track window, Mixer window, Program and Note Change window, and the Arrangement window. Things never feel cluttered, as most of the business of entering and editing music takes place within the Edit window. This window is robust in MIDI editing features and well designed, with everything in reach.

Among the features brought over from EZVision are color-coded tracks for easy visual reference, and the Arrangement window, still the easiest way to compose and assemble a modular song. You can drag and drop up to 25 sequences like so many building blocks. Musicshop also supports Opcode's Galaxy librarian products.

Flexible quantization is masterfully handled in Musicshop. There are five kinds of quantization, including Quantize Playback, which affects playback only, without changing any of the MIDI data—a great way to experiment with different quantize settings before making them permanent. Anyone who's ever quantized too much or the wrong way will appreciate this feature. Each track can have its own kind of quantization.



Edit Window Here, Musicshop's well-designed Edit window shows the notation view. Note the strip chart at the bottom and each track's color.

Musicshop is an excellent choice as a first sequencer at a bargain price. The documentation is extremely well written and useful. Context-sensitive online help is a keystroke away. The program is powerful enough to satisfy the needs of all but the most intrepid MIDI users, for whom Opcode offers an upgrade to Vision.

—RICHARD FENNO

PaintBoard Turbo

Video Board

PROS: QuickDraw acceleration; useful hardware-assisted navigation aids; self-configuring; expandable. **CONS:** Can't change resolutions on the fly; maximum 1024-by-768-pixel resolution; too long for 7-inch NuBus slots. **COMPANY:** RasterOps (408/562-4200). **LIST PRICE:** $1499.

MW ★★★

NOW THAT 24-BIT COLOR IS CONSIDERED the bottom rung for desktop image manipulation, folks are finding the video adapters built into the newest modular Macintoshes slow and limited. Only the Quadra's built-in video supports 24-bit color on large monitors, and even it is hard-pressed to deliver both speed and color depth simultaneously.

To the rescue comes PaintBoard Turbo, one of a new breed of midrange video adapter boards using the latest digital signal processing chips to provide very good performance at reasonable prices. The PaintBoard supports 24-bit color on monitors up to 17 inches and resolutions as high as 1024 by 768 pixels; with 3MB of video RAM on board, it offers QuickDraw and text acceleration, and a host of hardware-assisted navigation features.

Installation is easy and safe enough for nontechnicians—thanks to the clear, concise, yet thorough user's guide and a supplied antistatic wrist strap. With RasterOps monitors, the board automatically senses the monitor's resolution. With other monitors, a onetime procedure lets you view all available resolutions and choose one.

The board incorporates two innovative design features. The first is an expansion socket that lets you add optional hardware enhancements via plug-in daughterboards. The PhotoPro daughterboard, for example, adds a RISC processor for accelerating Adobe Photoshop filter transforms. Future daughterboards will enhance color-depth and resolution options. The second innovation is reprogrammable ROM, which lets you update the on-board firmware. For example, the update from version 1.0 to 1.1 added text acceleration. RasterOps distributes ROM updates through its own BBS and commercial online services.

RasterOps' Monitors control panel extension lets you activate several usability features. A hot-key-activated zoom enlarges the screen image up to 16 times—handy for detail work on images. As you move the cursor around the screen, the hardware automatically pans to show off-screen parts of the image; you can choose edge pan, which activates when you reach the edge of the screen, or cursor pan, which slides the image around to keep the cursor centered on screen. Because panning is implemented in hardware, it is always fast and smooth, regardless of how hard the Mac is working.

You can configure a virtual desktop of up to 1024 by 4096 pixels. Using the virtual desktop reduces to 256 the number of colors you can display. Finally, to simplify life with a large monitor, you can configure the menu bar to pop-up on the desktop, and dialog boxes to center on the cursor.

Performance tests showed the PaintBoard Turbo to be about ten times as fast as the on-board video on an unaccelerated Mac IIci. The speed improvement is less pronounced on newer Macs, such as the Centris and Quadra lines: on these machines the PaintBoard Turbo ran two to three times as fast as the on-board video. For the price of the board, this is respectable performance. Limitations that might trouble you are the 1024-by-768-pixel maximum resolution, too low for 20-inch and larger monitors; the inability to change resolutions without restarting; and the fact that the board is too long for the Centris 610 and other Macs limited to 7-inch NuBus slots. If you can live within these boundaries, the PaintBoard Turbo is a reasonably priced performance enhancer.

—MEL BECKMAN

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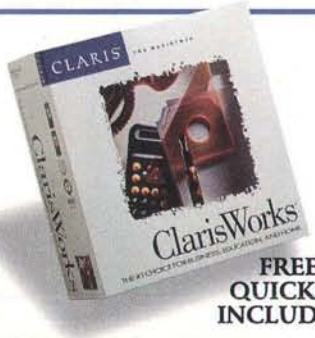

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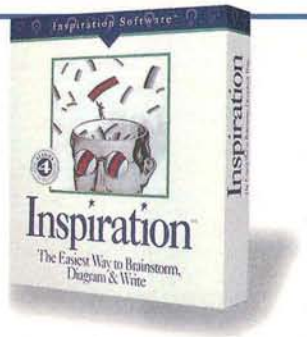

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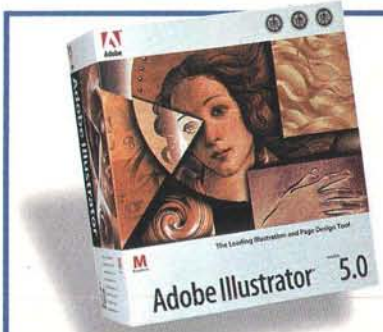
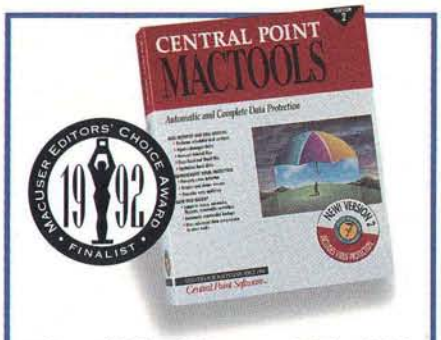
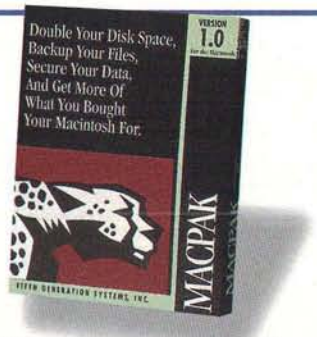


Adobe Systems
11843 *Adobe Illustrator 5.0*—More innovations in illustration and page design! Directly manipulate overlapping areas of objects. Combine, divide, slice, dice, or crop. Create new objects and special effects ..... **$368.**

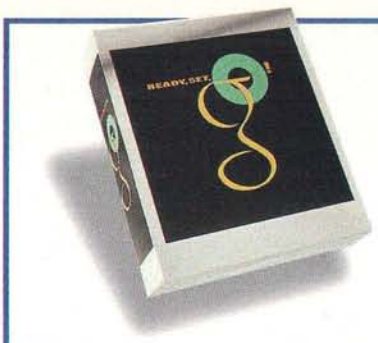
★ **Apple Computer ... 30 day MBG**
3008 Apple Font Pack ..... $74.
Broderbund Software
3572 Kid Pix 1.2.. 34. 7293 Companion..... 23.
1427 Print Shop... 35. 6281 TypeStyler 2.1 126.
Caere
4930 OmniPage Professional 649. 7705 Direct 000.
★ **Claris ... 30 day MBG**
2518 MacDraw Pro 275. 8007 Claris CAD 599.
★ **Claris Clear Choice ... 30 day MBG**
11203 Brushstrokes 95. 11473 Comp. Upgrd. 75.
★ **DeltaPoint ... 60 day MBG**
11580 Special: 1-2-3 Mac & DeltaGraph Pro Bun. 99.
★ **Deneba Software ... 30 day MBG**
11055 artWORKS... 99. 3227 Canvas 3.0... 259.
★ **Eastman Kodak ... 30 day MBG**
12270 Photo CD 29. 12265 ColorSense Mgr. 329.
★ **Expert Software ... 30 day MBG**
4870 Expert Color Paint, 1737 Landscape, 8619 Home, or 1731 Office Design *ea.* 29.
Fractal Design
1068 Sketcher 1.0 ..... 93.
10402 Painter 2.0 265. 1564 PainterX2 *special* 79.
Gold Disk
12279 Astound 95. 12276 Animation Works 115.
Graphsoft
11723 BluePrint... 199. 11724 MiniCad +.. 589.
Gryphon
4202 Morph 1.1 ..... 89.



★**Central Point Software ... 30 day MBG**
11882 *MacTools 2.0*—1992 *MacUser*'s Editors' Choice Award Finalist for *Best Protection Program.* New Version offers auto backup, data recovery and virus protection. Now bundled with *Now Utilities* **$99**



★**Fifth Generation ... 30 day MBG**
5342 *MacPak 1.0*— Includes AutoDoubler, CopyDoubler Lite, DiskLock PB, FastBack Express, DiskTools, and PIMs which can be accessed through the popular Launch Pad Utility. Indispensable utilities collection **$96.**

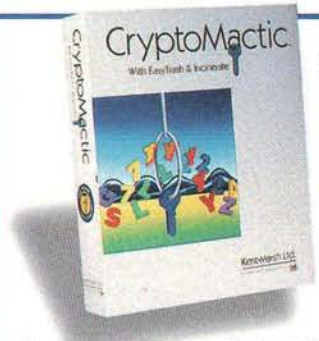


★**Manhattan Graphics ... 30 day MBG**
4990 *Ready,Set,Go! 6.0*—Desktop publishing that puts professional layout capability within every user's reach. Includes grids, an electronic pasteboard, precision text & object rotation, & a powerful typographic word processor **$219.**

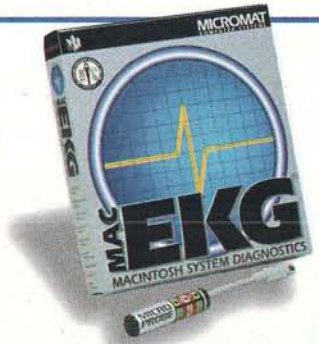
★ **Letraset ... 30 day MBG**
Letraset FonTek Library - Full line avail. call
Light Source
11059 Ofoto 2.01 ..... 275.
★ **Manhattan Graphics ... 30 day MBG**
4990 Ready,Set,Go! 6.0 *(August '93)* ..... 219.
Postcraft International
2210 Effects Specialist 2.0 ..... 89.
Quark
7612 QuarkXPress 3.1 ..... 549.
★ **Ray Dream ... 30 day MBG**
12264 JAG II *(increase image quality)* ..... 89.
4761 Designer 199. 12280 addDepth 1.0.2 125.
★ **Specular International ... 30 day MBG**
4962 Infini-D 2.5 ..... 699.
★ **Synergy Software ... 30 day MBG**
6617 KaleidaGraph 3.0 ..... 149.
★ **T/Maker ... 30 day MBG**
ClickArt *(bitmapped)*.. 34. or *(EPS)*... 55.

PROGRAMMING

★ **Abbott Systems ... 30 day MBG**
11735 FindAll 1.0 36. 5236 CanOpener 2.0 59.
2515 Calc+..... 36. 9578 Kaleidoscope... 25.
★ **Aladdin Systems ... 30 day MBG**
7410 StuffIt SpaceSaver 3.1 34. 6740 Deluxe 65.
★ **Apple Computer ... 30 day MBG**
1206 At Ease 44. 7072 QuickTime Starter Kit 105.
1074 System 7.1 *(with free PCTV video)* ..... 79.
★ **Berkeley Systems ... 30 day MBG**
1502 The Disney Collection Screen Saver..... 28.
5737 After Dark 2.0x *(30+ screens!)* ..... 28.
2198 More After Dark.. 23. 2196 Bundle.. 39.
3392 Star Trek: The Screen Saver..... 34.
★ **Binary Software ... 30 day MBG**
12475 Bloopers 19. 11989 Square One 1.5 45.
Casa Blanca Works
1593 Drive 7 2.3 ..... 49.
★ **CE Software ... 60 day MBG**
1727 CalendarMaker 39. 8024 QuicKeys^2 89.
★ **Central Point ... 60 day MBG**
10595 Safe & Sound 32. 11882 MacTools 2.0 99.
★ **Claris Clear Choice ... 30 day MBG**
11205 Retrieve It! ..... 60.
★ **Dantz Development ... 30 day MBG**
9115 DiskFit Direct 1.0... 29. 3393 Pro .... 72.
5255 Retrospect.. 147. 7945 Remote 2.0.. 259.
★ **Datawatch ... 30 day MBG**
4803 Virex/Mac 57. 11486 SuperSet Utilities 85.
★ **Fifth Generation ... 30 day MBG**
5342 MacPak 1.0.. 96. 3955 Suitcase 2.1.2 53.
7404 DiskDoubler 52. 4838 AutoDoubler ... 58.
12298 AutoDoubler/DiskDoubler Combo ..... 85.
10398 CopyDoubler 39. 7704 Public Utilities.. 98.
FWB, Inc.
2999 Hard Disk ToolKit $125. 7929 Personal $49.
★ **Golden Triangle ... 30 day MBG**
11731 TimesTwo *(1.44)*.. 95. 11773 *(800K)*.. 95.
★ **Harvard Systems Corp. ... 30 day MBG**
11193 Kai's Power Tools for Photoshop ..... 89.
★ **Inline Design ... 30 day MBG**
7068 INITPicker 49. 1740 Redux Deluxe 1.63 49.
★ **Kent Marsh Ltd. ... 30 day MBG**
9513 FolderBolt 71. 1839 NightWatch II ..... 89.
1725 CryptoMactic ..... 55.
★ **Kiwi Software ... 60 day MBG**
11736 Screenscapes..... 34.
★ **Logical Solutions ... 30 day MBG**
10169 7th Heaven 2.5 67. 11191 Chameleon 39.
MicroMat Computer Systems
3732 MacEKG II 89. 11794 MicroProbe ADB 69.
2998 Drive Tech ..... 41.
★ **No Hands Software ... 30 day MBG**
11195 Magnet 85. 11194 Common Ground 122.
★ **Now Software ... 30 day MBG**
12303 Now Compress.. 65. 12304 Now FUN! 45.
6925 Now Utilities 4.0 84. 8471 *(10)* ..... 775.
★ **Quadrangle ... 30 day MBG**
5288 Lights Out Sports Fans..... 35.
SNA, Inc.
10594 OffLine ..... 62.
Stac Electronics
11568 Stacker for Mac ..... 65.



★**Kent Marsh Ltd. ... 30 day MBG**
1725 *CryptoMactic*—Invincible encryption built-into the desktop. Optional use of override makes its security impenetrable. Incl. EasyTrash & Incinerate, for trashing or shredding w/a single keystroke. See line listings for addt'l prod. **$55.**



MicroMat Computer Systems
3732 *MacEKG II*—Performs diagnostic tests to inform you of problems.....**$89.**
11794 *MicroProbe ADB*—Quickly tests Mac's ADB as well as other vital components.... **69.**
2998 *Drive Tech*..... **41.**

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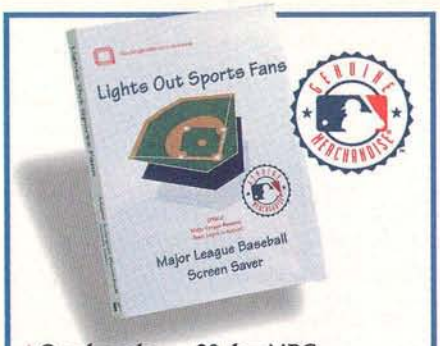

★Quadrangle ... 30 day MBG

5288 *Lights Out Sports Fans*—A Major League Baseball screen saver with 10 exciting game plans. Watch your favorite Major League Baseball team logos in action while they prevent burn-in. Includes all 28 teams.... **$35.**

★ **Symantec ... 60 day MBG**
5176 SAM 3.5 64. 6748 Norton Utilities 2.0 95.
11727 C++ 6.0 for Mac 339. 2688 THINK C 6.0 199.
★ **Teknosys ... 30 day MBG**
5203 Help! 88. 12291 Competitive Upgrade 49.
UserLand Software
4753 Frontier 2.0 ..... 185.

LEARN & PLAY

ActiVision
1039 Shanghai II 29. 1134 Lost Treasures Vol. I 40.
Broderbund Software
Carmen Sandiego Series *(CP)*..... *ea.* 29.
8285 Where/World Carmen Sandiego Deluxe 47.
11561 TRISTAN Pinball ..... 35.
Buena Vista Software
1711 Heaven and Earth ..... 34.
★ **Callisto ... 30 day MBG**
11369 Super Mines 29. 11756 Super Maze Wars 39.
★ **Carina ... 30 day MBG**
7761 Voyager II, the Dynamic Sky Simulator.. 99.
★ **Centron Software ... 30 day MBG**
5910 Crossword Creator 39. 8524 Casino Master 45.
★ **Davidson & Associates ... 30 day MBG**
10953 Kid Pictures 19. 2574 MathBlaster Plus 34.
7942 Kid Works 2 34. 1076 Zoo Keeper..... 34.
Delta Tao Software
2536 Spaceward Ho! or 2439 Strategic Conq. 36.
★ **Edmark Corporation ... 30 day MBG**
7155 Kid Desk 24. 7318 Millie's Math House 29.
1078 Bailey's Book House ..... 29.
Electronic Arts
1907 PGA Golf 38. 2805 Tournament Course 18.
Graphic Simulations
8083 Missions at Leyte Gulf *(req. Hellcats)*.... 20.
4756 Hellcats Over the Pacific 1.0.3 ..... 38.

★Davidson & Associates ... 30 day MBG

7942 *Kid Works 2*—Gives kids all the tools they need to create & hear their own stories!. **$34.**

1076 *Zoo Keeper*—Kids learn about all sorts of wild & wonderful animals. Real-life photos, sounds, and animations ..... **34.**

★ **Great Wave ... 30 day MBG**
6693 KidsMath 2.0 or 2276 Kid's Time .. *ea.* $25.
8527 NumberMaze or 3471 DaisyQuest.. *ea.* 35.
★ **HyperGlot Software ... 30 day MBG**
(Language Tutorials: full line available)
★ **Inline Software ... 30 day MBG**
1562 3 in Three... 31. 11188 Pax Imperia... 35.
Interplay Productions
1615 Mario Teaches Typing..... 29.
Bridge Deluxe or Out Of This World ea. 34.
★ **Learning Company ... 30 day MBG**
Reader Rabbit Series..... *ea.* 34.
★ **Leister Productions ... 30 day MBG**
7126 Reunion 3.0..... 115.
★ **Maxis ... 30 day MBG**
11272 SimAnt..... 29. 11270 SimLife..... 39.
11629 SimCity Supreme Bundle ..... 45.
5279 SimCity Classic 24. 11628 A-Train Bun. 45.
★ **MECC ... 30 day MBG**
3959 Word Munchers 18. 3963 Oregon Trail 28.
★ **Microsoft ... 30 day MBG**
2868 Flight Simulator 4.0 *(CP)*..... 42.
Psygnosis
11562 Lemmings..... 35.
Software Toolworks
4619 Mavis Beacon Typing 2.0 *(CP)*..... 29.
5201 The Miracle *(piano teacher)* ..... 349.
★ **Spectrum Holobyte ... 30 day MBG**
3464 Tetris..... 23. 4835 Super Tetris .... 29.
3017 Wordtris 1.0 29. 9113 Falcon Color.... 39.

NEW PRODUCT!

★Maxis ... 30 day MBG

5279 *SimCity Classic*—You're the planner. Fight urban blight and build a prosperous city, or lose your precious citizens! ..... **$24.**

11272 *SimAnt*—Ants. You've squashed, sprayed, cursed, and bombed them. Now *be* them! **29.**

StudyWare
ACT, GMAT, GRE or SAT Prep ..... *ea.* 29.
Velocity
11538 Spectre Supreme 40. 11537 LAN 2-Pak 52.
Virgin Software
Scrabble or Monopoly *ea.* 19. 1746 Risk 29.

VIDEO AND SOUND

Articulate Systems
Voice Navigator SW (Head/Desk Mike) *ea.* 319.
Coda Music Technology
8188 MusicProse 2.1 189. 5604 Finale 3.0 549.
Macromedia
7651 Action Mac 369. 5087 Director 3.1 .... 799.
4598 MacRecorder Sound System PRO..... 255.
★ **Media Vision ... 60 day MBG**
12577 Pro AudioSpectrum for LC ..... 299.
11738 Pro AudioSpectrum 16 NuBus ..... 329.
Nova Development
11101 Kaboom! 29. 12278 w/More Kaboom! 40.
Opcode Systems
12230 Midi Translator II.. 42. 12225 Vision.. 339.
12226 Audioshop 1.05 61. 12227 Musicshop 1.0 99.
Passport Designs
10362 Passport Producer 95. 8250 Encore 379.
Radius
1738 PrecisionColor Pivot *(reqs. interface)*.. 999.
RasterOps
8944 24STV 799. 3043 Paint Board Turbo 1199.
3048 20/20 Multiscan Color 20" Display..... 1499.

★Berkeley Systems ... 30 day MBG

1502 *The Disney Collection Screen Saver*—Incl. over 15 well-known Disney characters.. **$28.**

3392 *Star Trek: The Screen Saver* ..... **34.**

5737 *After Dark 2.0x (30+ screens!)*..... **28.**

2196 *After Dark & More After Dark Bundle* **39.**

Sigma Designs
1565 MovieMovie 299. 11541 ErgoView 17 1199.
★ **Sony ... 60 day MBG**
10530 CPD-1430 14" Multiscan Trinitron Monitor 689.
10529 CPD-1730 17" Multiscan Trinitron..... 1149.
★ **SuperMac/E-Machines ... 30 day MBG**
4122 VideoSpigot LC 245. 4164 *(for NuBus)* 375.
7677 SuperMatch 17" Color 999. Trade Up.. call
12704 20" Plus Color..... 1799.
4720 21" Platinum Two-Display ..... 1099.
10321 ColorPage T16II ..... 1299.
11983 Thunderstorm 619. 11982 Thunder/24 2299.
9066 Futura SX.... 369. 9065 Futura MX... 649.

CD-ROM

Against All Odds
10330 From Alice To Ocean Book *(w/CDs)*..... 39.
Broderbund
3730 Just Grandma and Me..... 34.
9059 Arthur's Teacher Trouble..... 41.
CD Technology
2321 CD-ROM Caddy.. 11. 2533 *(5 pack)*. 49.
4084 America Alive! 75. 8057 Porta Drive 619.
FWB, Inc.
10198 CD ToolKit.. 49. 11582 HammerCD.. 739.
★ **Highlighted Data ... 30 day MBG**
1488 Elec. Map Cabinet or 7771 Webster's Dict. 149.
Interplay Productions
7111 Battlechess CD-ROM Enhanced..... 45.
★ **Media Vision ... 60 day MBG**
CD-ROM Multimedia Kit *(Sony or NEC)* 699.
★ **Microsoft ... 30 day MBG**
1741 Musical Instuments on CD-ROM..... 55.
NEC
6577 CDR-38 Portable CD-ROM Drive..... 369.
6582 CDR-74-1 CD-ROM Drive..... 599.

★Media Vision ... 60 day MBG

11570 *Multimedia Kit for Mac*—Get a super-fast CD-ROM drive, speakers, the Multimedia Encyclopedia, Battle Chess, Out of This World, & the CD-ROM ToolKit, at a great price! **$699.**

12577 *Pro AudioSpectrum for LC* ..... **299.**

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WordPerfect Works
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S.C.OUT
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BTI Battery MC-170,
and PowerSwap
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DEAL!
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with Painter 2.0
$499.
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(hundreds of dollars)
Lotus 1-2-3 for Mac
and
DeltaGraph Pro
$99.
12715

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★**Lotus/DeltaPoint ... 60 day MBG**
11580 *1-2-3 for Mac 1.1/DeltaGraph Pro Bundle*—Get Lotus' easy-to-use, full-featured spreadsheet, and DeltaPoint's comprehensive, flexible charting and presentations package, both for one great price! While supplies last..... **$99.**

★**Kensington ... 30 day MBG**
9585 *Notebook Traveler Executive*—Kensington cases feature internal PVC supports, closed-cell padding, removable shoulder strap, and a protective wire frame to maintain shape .. **$115.**
1092 *Deluxe*..... **75.** **11552** *Compact*... **49.**

★**SuperMac Technology ... 30 day MBG**
12027 *SuperMatch 17" Multimode Trade Up*—Send us your Apple 13" Color Monitor (we'll pay the postage) & save *up to $275 off* our $999 regular price on a SuperMatch 17" Multimode Color Display..... **call for details***

Key Tronics
6974 Mac Pro + Kybrd. 139. 1070 TrakPro 219.
★ **Logitech ... 30 day MBG**
1671 MouseMan... 77. 1672 TrackMan..... 55.
★ **Microtek Labs, Inc. ... 30 day MBG**
5438 ScanMaker II w/Adobe Photoshop LE. 899.
5441 ScanMaker IIxe w/Photoshop *(full pkg.)* 1199.
★ **Mouse Systems ... 30 day MBG**
7520 Little Mouse ADB or 8001 Plus ..... *ea.* 68.
9471 A³ Mouse..... 74.
NEC
2933 SilentWriter Model 95 with Fax..... 1199.
★ **Sophisticated Circuits ... 30 day MBG**
8009 PowerKey 2.01. 75. 8008 Remote ..... 32.
Thunderware
4994 LightningScan 400 319. 3107 Pro 256 489.
★ **WACOM ... 30 day MBG**
11259 The ArtZ *(6" x 8" Graphics Tablet)* ..... 325.

UPGRADES & DRIVES

SIMMs ... *Various, incl. manual & video* call
★ **Applied Engineering ... 30 day MBG**
8361 1.44 MB HD Drive 229. 5290 Plus Drive 299.
10282 TransWarp 4300 *(40 MHz, no FPU)*.... 389.
★ **DayStar Digital ... 30 day MBG**
Does not include optional math chip.
1613 FastCache 040 *(Quadra 700 or 900)* .. 279.
11987 FastCache 040 *(Quadra 700, 800, 900, 950)* 409.
1312 Turbo 040i 20 MHz 719. 1302 33 MHz 899.
PowerCache for SE/30, II, IIx, IIcx, IIci, IIsi, LC 40 MHz ..... 539. 50 MHz..... 679.
FWB, Inc.
9529 PocketHammer 170 599. 2314 PH 240 739.
12011 PH 525 1349. 7991 hammer1000FMF 1749.
IOMEGA
6499 90 MB Transportable *(reqs. interface)*. 659.
2467 90 MB Gold Std. Rem. Cart. *(Qty. 3)*... 379.
8781 Mac Transportable 90 PRO..... 499.
10499 Transportable MultiDisk 150..... 799.
MASS Microsystems
3678 120 MB Port. HD 345. 3663 210 MB 499.
★ **MDS Drives ... 60 day MBG**
MDS 44 SyQuest w/SW & cartridge *ea.* 389.
MDS 88... *ea.* 489. MDS 88c... *ea.* 539.
11881 MDS 120 MB Fixed Drive *(zero footprint)* 319.
11880 210 MB..... 439. 11863 540 MB ..... 999.
11963 MDS 120 MB Fixed Drive *(upright)* ..... 349.
11962 210 *(upright)* 469. 11961 540 *(upright)* 999.
Peripheral Land, Inc. (PLI)
6432 3½" Optical Media 52. 9737 *(10 pak)* 499.
4645 PLI Infinity MO 3.5" Optical Drive..... 1449.
8327 PLI Infinity 40 Turbo 479. 9752 Inf. 88 579.
11470 PLI Infinity 88/RW 44..... 649.
2864 PLI Infinity Floptical Drive *(21 MB)*..... 399.
2865 Floptical Cart. *(21 MB)* 29. 2899 *(10 pk.)* 259.
★ **SuperMac/E-Machines ... 30 day MBG**
2256 Thunderstorm Deluxe..... 899.
10322 PowerLink Presentor..... 439.

MEDIA

★ **BASF ... 30 day MBG**
11803 3½" HD Disks *(40)* w/free T-120 *special* 45.
★ **Fuji ... 60 day MBG**
4863 3½" HD Disks *(20)* with storage case.... 24.
★ **KAO Infosystems ... 60 day MBG**
11870 3½" HD Disks *(10)*.. 12. 11869 *(30)* .... 35.
★ **KOMAG ... 30 day MBG**
10439 3½" Optical Media.. 39. 10442 *(5)*... 175.
★ **Sony ... 60 day MBG**
3298 3½" HD Disks *(10)*. 13. 6495 *(50)*..... 50.
1603 DG60M..... 15. 2520 DG90M..... 19.
1895 QD2120..... 19. 11524 3.5" Opt. Media 50.
★ **SyQuest ... 60 day MBG**
5912 44 MB Cartridge *(1)*... 65. 5528 *(5)* .. 310.
3603 88 MB Cartridge *(1)*.. 100. 5530 *(5)* .. 480.

ACCESSORIES

★ **Apple Computer ... 30 day MBG**
9773 StyleWriter Ink Cart. 19. 8499 *(3 pack)* 55.
7748 Personal LaserWriter Toner Cartridge .. 65.
1115 LaserWriter II Toner Cartridge..... 85.
★ **Avery ... 60 day MBG**
5392 Avery 5196 (3½"-*Disk Labels-Laser*)..... 29.
★ **I/O Design Cases ... 30 day MBG**
8812 Ultimate Classic 60. 1941 Ultimate LC 89.
1473 PowerBook Attache Case *(burgundy)*. 149.
★ **Kensington *(full line)* ... 30 day MBG**
2559 Apple Security Kit 33. 4973 Pwr. Tree 20 24.
★ **Moustrak ... 30 day MBG**
Star Trek Mouspads..... *ea.* 14.
★ **Targus ... 60 day MBG**
7369 Notepac 35. 7370 Business Traveler 199.

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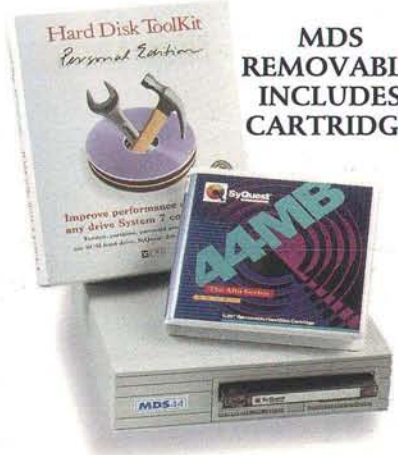
All other areas: Please call 603-446-3333 or FAX 603-446-7791 for information.



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★**MDS Drives ... 60 day MBG**
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MDS Removable SyQuest Drives—Also comes complete with one cartridge.
8141 *MDS 44*..... **$389.**
8125 *MDS 88*... **489.** 10590 *MDS 88c* **539.**
MDS Fixed Drives—available in zero footprint or upright models. The former units come with a shielded 18" SCSI cable and two switched AC outlets. Uprights include a 3' SCSI cable.
11881 *MDS 120 Fixed Drive (zero footprint)* **319.**
11880 *210 MB*.. **439.** 11863 *540 MB* .. **999.**
11963 *MDS 120 MB Fixed Drive (upright)* **349.**
11962 *210 MB*.. **469.** 11961 *540 MB* .. **999.**

Peripheral Land, Inc. (PLI)
12442 Multi-Session CD-ROM Drive Bundle $699.
★ **Presto Studios ... 30 day MBG**
11330 The Journeyman Project ..... 56.
Software Toolworks
10308 US Atlas 34. 3915 Grolier Encyclopedia 225.
★ **Spectrum Holobyte ... 30 day MBG**
1485 Iron Helix ..... 59.
Wayzata Technology
11605 CD Fun House 25. 10188 Macnificent 7 35.

COMMUNICATIONS

★ **Apple Computer ... 30 day MBG**
7073 Mac PC Exchg. 59. 7102 AppleShare 969.
7101 AppleTalk Remote Access ..... 149.
Asanté Technologies, Inc.
Asanté Lite Ethernet Cards ..... *ea.* 125.
2775 10/T Hub-8 249. 2772 10/T Hub-12 499.
BOCA Research
11052 M144I V.32bis FaxModem ..... 239.
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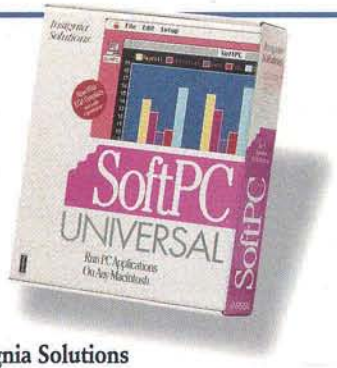

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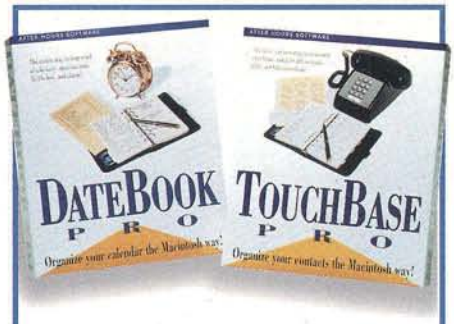

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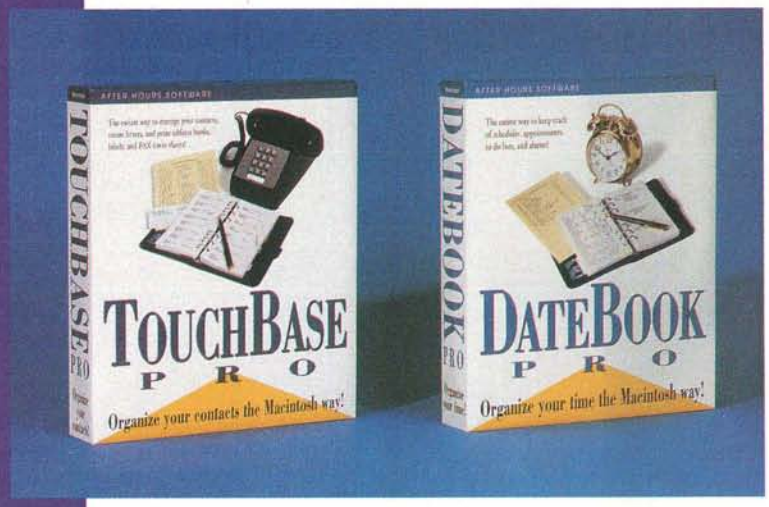

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Spelling Coach Professional 4.0.1

Writing Reference Software

PROS: Substantial dictionary; convenient menu display. **CONS:** Slow; arbitrary word-correction suggestions. **COMPANY:** Deneba Software (305/596-5644). **LIST PRICE:** $195.

MW ★★★

SPELLING COACH PROFESSIONAL 4.0.1 is a writing reference system that includes a spelling checker, thesaurus, and dictionary program. After you install Coach Pro's built-in, 95,000-word dictionary (based on *Webster's Ninth New Collegiate* from Merriam-Webster) on your hard disk, the Coach Pro menu appears on the menu bar in a variety of Macintosh applications. (The programs I used in testing were Microsoft Word 4.0 and Excel 4.0, QuarkXPress 3.1, QuickMail 2.5, and AppleLink.) The system is simple to learn and easy to use. Yet Coach Pro is at best only comparable to similar programs on the market.

Coach Pro's spelling checker drags down an otherwise impressive program: not only is its correcting function slow at locating suggestions, but at times the alternatives the spelling checker suggests are downright ludicrous. For example, Coach Pro offers a phonetic spelling-checker option, ostensibly for those of us with serious, deep-seated spelling problems. Unfortunately, this feature produced nothing but confusion for me. For instance, when I mistyped the word *statement* as *staement*, Coach Pro offered this list of phonetic substitutes: "tsunami, stonemason, tweezing, stomped" (no kidding).

As for routine typographic corrections, Coach Pro is more proficient at identifying errors than at providing adequate solutions. Missing or transposed letters smoetimes ("smockings, smocks, smog, smoggier") befuddle the dictionary.

Coach Pro's thesaurus, on the other hand, is impressively large, and even fun to use. Word choices are intelligent and comprehensive. Within each entry, Coach Pro provides an analysis of synonyms; antonyms; and compared, related, and contrasted words. As with other electronic thesaurus programs, you can look up words within definitions by double-clicking on the desired word; this method of cross-referencing is a convenient alternative to paging manually through a traditional thesaurus. Yet Coach Pro's synonym-finder also has a rather odd feature: if the thesaurus has no synonym for a word, Coach Pro displays a dialog box with a scrolling list of the closest alphabetical references. When you enter *thesaurus*, for instance, the closest reference is *thermal springs*.

Coach Pro also contains a definitions module, which allows you to look up the meanings of words. Available definitions are accurate, if sometimes rudimentary and concise. Unless you read or edit others' work on your Mac, however, you probably won't use this part of the program. After all, what's the likelihood of coming across a word you don't know within your own writing? On the other hand, the definitions function can be useful in double-checking the meanings of words. Unfortunately, Coach Pro's overly basic explanations do nothing to clear up any real misgivings you may have about a particular word.

If you're considering investing in reference software as an add-on to your current system, Spelling Coach Professional is a relatively capable, if expensive, alternative to other programs on the market. (Writing Tools Group's American Heritage Electronic Dictionary, Microlytics' Word Finder Plus, and Alki Software's Microsoft Word's Comprehensive Spelling each list for less than $100.) If, however, all you need is a basic spelling-checker application, or if you already have a thesaurus built into your word processor, you don't need Coach Pro.

—SUSANNA CAMP

V for Victory: Utah Beach

World War II Simulation Game

PROS: Historically accurate; flexible configurations; great graphics; challenging for even the most hardened gamester. **CONS:** Occasional bugs; sometimes settings are ignored. **COMPANY:** Three Sixty Pacific (408/879-9144, ext. 23). **LIST PRICE:** $69.95.

MW ★★★

AN EXCELLENT RE-CREATION OF the post–D-Day conquest of Normandy, V for Victory: Utah Beach is not a game to play casually. With six scenarios, each one a part of the total Allied campaign against the Germans, and three levels of difficulty depending on the scope of the battle, expect to invest some time in Utah Beach. The game doesn't take long to learn, but the advanced levels take hours (perhaps even tens of hours) to play.

Utah Beach's strength is the way it blends easy play with complicated strategy. A relatively short operations manual orients you to the game's mechanics.

The in-depth reference manual, which incidentally dips into many arcana of the invasion, points out that despite the overwhelming numbers of men landed in Normandy on D-Day, the Allied army of World War II was not well equipped with trucks to move the troops. Also, because the weather was lousy, air strikes against ground targets were frequently scrubbed, or failed.

So the key to success in V for Victory is territorial control and strategic movement. To successfully attack enemy positions, you must surround them on a majority of sides, either directly, with one of your own battalions abutting, or indirectly, by exerting sufficient influence from nearby positions. Solidly entrenched groups are difficult, if not downright impossible, to defeat. But even simple terrain, such as forest or bocage (the stone-fenced pastures of provincial France), provides effective defense against enemy assaults. Air and naval bombardment help neutralize strong positions, and interdiction attacks from field artillery slow the enemy's escape.

The V for Victory games use a hexagonal game board, zones of control, and terrain multipliers like those of other popular strategic simulation games. Utah Beach is exceptional, in part due to the flexibility and realism of the game. You have control over battalion attachments, daily ordnance, reinforcements, levels of air superiority, and intelligence data. You can even play as the Germans. Utah Beach also supports several theoretical variations on the invasion such as delay of the elite German 6th Fallschirmjager Regiment, or the enactment of the original Allied Airborne plan to drop the 82nd Airborne Division on the west coast of the Cotentin Peninsula, variations that result in even more challenging play.

For the less ambitious, control of artillery, supply, and even troop movement can be delegated to your staff (the computer), depending on how much you want to micromanage your battles.

The game gives you details about attack and defense strength, morale, fatigue, and even calculations of attack odds, which take these attributes, as well as terrain, into account.

On the downside, Utah Beach has a few bugs, most of which occur at precisely the wrong moment (I had to recover with the AutoSave file more than once); several times when I chose the configuration Fog of War, which limits knowledge of enemy strengths and positions to units that have been directly encountered, the game gave me omniscience instead.

All in all, however, Utah Beach is a great game. It guarantees hours of challenging engagement for historical-game enthusiasts and strategy gamesters alike.

—TIM WARNER

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$49/ea.

StatView 4.01

Statistics Software

PROS: Superior interface, import, and editing; presentation-quality graphs; intelligent structure for add-on tools. **CONS:** Missing a few features and tests. **COMPANY:** Abacus Concepts (510/540-1949). **LIST PRICE:** $595.

MW ★★★★

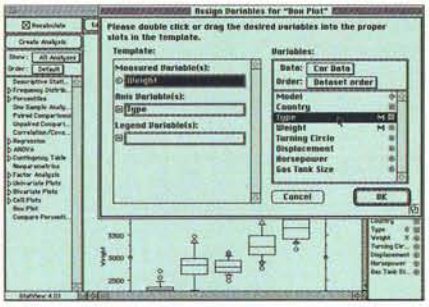
STATVIEW 4.01 ENCAPSULATES A MINIature history of the Mac. The program started as StatView 512, a compact mainstream statistics program, and over the past eight years it has taken advantage of each upgrade in Mac speed, memory, and color. The statistical tests in 4.01, for example, are nearly the same as the set in StatView 512, but access to and output from the tests has been greatly enhanced.

Data import, for example, automatically decodes category information from tables imported as tabbed text, using an intelligent interpretive scheme that worked correctly on all 20 Macworld Lab test examples. Once the data has been saved in a StatView spreadsheetlike data set, you pick an analysis either from the scrolling analysis list or from the templates under the Analyze menu. The templates, like the data-import function, include lots of interpretation—this program comes very close to picking the right analysis and writing your report automatically. For working with templates you have designed from scratch, StatView includes Browser palettes for assigning variables and viewing results, a Try Me First view to explain how these work, and a context-aware Hints window.

StatView has many large and small strengths. Factor analysis is quick and easy, and the already strong ANOVA section can be supplemented for $100 with Abacus's SuperANOVA add-on. The Formula calculator for transforming data is wonderful. The Split-By option in the variable Browser is the best data-grouping facility yet developed. The templates in StatView bring the convenience of command files for repetitive analysis to an interface that's exclusively mouse-driven (we literally never used the keyboard to perform our test suite). Because you can modify all graph colors, formats, background, and text, and you draw directly on graphics layers, you can use StatView to make final presentations. In fact, that's a key difference between StatView and other statistics programs.

There are still a few possible complaints about StatView. It lacks the brushing and slicing tools found in DataDesk (these make exploratory investigation of data sets much easier); to get these you need the $100 MacSpin add-on. Although the presentation graphics are better than those in other Mac statistics programs, if you want really flashy stuff (graded fills, fancy text treatment) you need DeltaGraph Pro or Aldus Persuasion. StatView still lacks cluster analysis and time-series statistics; the Quality-Control add-on ($100) provides some time-series substitutes. If you don't need these features, however, you won't find much wrong with StatView.

If your work uses statistics for decision support rather than abstract analysis, and you have to present your results regularly to nonstatisticians, you can't do better than StatView 4.01.—CHARLES SEITER



Easy Does It StatView 4.01 makes data handling particularly simple. You just drag variables from your data set to the analysis variable categories in a dialog box like this one. The program does the rest.

Daily Sports Quiz 1.0

Trivia Game

PROS: Informative; challenging. **CONS:** Scoring relies on honor system. **COMPANY:** DreamTime (619/236-1341). **LIST PRICE:** $49.95.

MW ★★★

IF YOU THINK YOU KNOW A LOT ABOUT sports and you love to play trivia games, then get ready for DreamTime's Daily Sports Quiz.

This entertaining sports-trivia game contains nearly 1100 questions in 8 categories—baseball, basketball, football, hockey, Olympics, golf, tennis, and grab bag—stretching from the original Greek Olympics, at the dawn of sporting competition, to the present day.

Once you've installed Daily Sports Quiz, you can set it so that each time you start up the Mac three sports-trivia questions appear on screen. When you think you know the answer, double-click on the icon opposite the question, and a window displaying the answer appears.

What sports game would be complete without a few statistics? Daily Sports Quiz keeps track of how well you do and can be set to display your success rate either overall or in each of the 8 categories. (Maintaining an accurate tally of your score requires that you respect the honor system, however.)

I'm a sportswriter by trade, so you'd think I'd be batting 1.000 or at least pretty close, right? Wrong. Last time I checked, I was getting a little more than 55 percent of the questions correct. There are no obvious questions in the bunch. Still, the questions are not so vague or obscure that the game isn't fun.

If you are anything like me, you want more than the daily dose of three questions. In that case, simply open the Daily Quiz control panel under the Apple menu. Double-click on New and you'll have three more questions.

You can look at previously answered questions using the review box, and you move through the questions one at a time. The category that's being viewed is indicated at the top of the box. To change categories, simply use the pull-down menu that appears under the current category name. From there just click on the category you're interested in. The previously answered questions in that category are then displayed.

A valuable job-saving feature is Sports Quiz's Hot Key, which quickly hides Sports Quiz in the event your boss comes into your office while you're playing. A hot key can be virtually any combination of keys on the keyboard as long as it includes ⌘, option, shift, or control.

I have only one minor complaint about Daily Sports Quiz, and that is that the game's scoring relies on the honor system. Maybe if there's a Sports Quiz II someday, DreamTime can make it a multiple-choice game. That way you could be sure to get a more accurate account of your sports-trivia knowledge. But all in all I enjoyed Sports Quiz. It's a challenging and informative sports-trivia game.—ANDREW MILLER

And the Answer Is To my wife's great surprise, I was able to answer all three of these trivia questions correctly.

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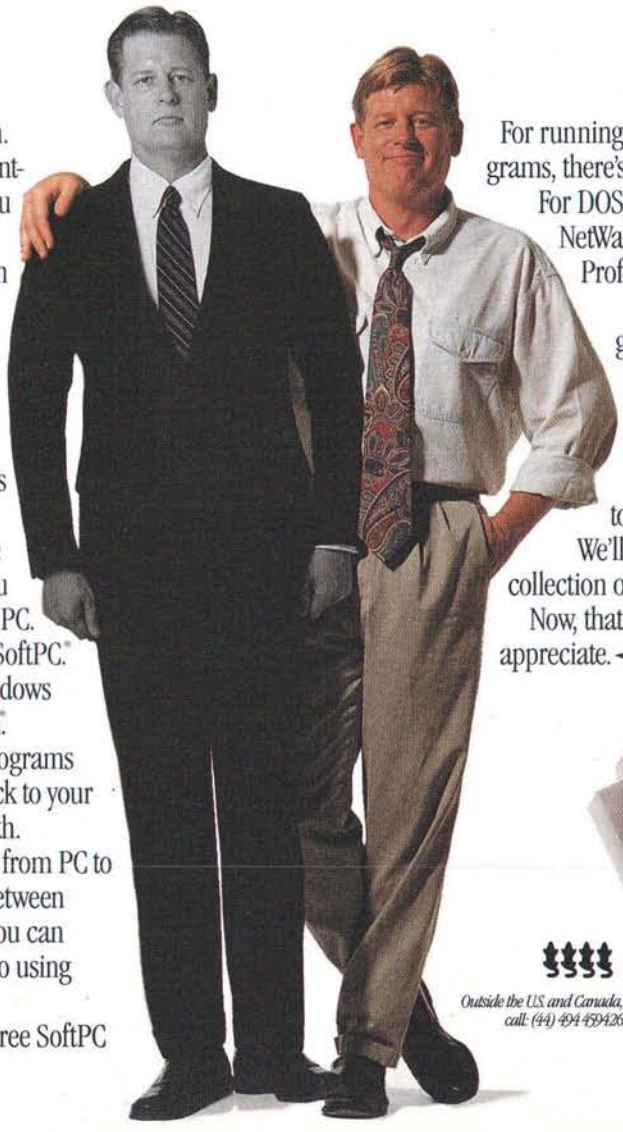

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CLImate 1.0

Command-Line Interface

PROS: Compact; fast; capable of writing powerful general-purpose utilities; supports I/O redirection. **CONS:** Slender manual.
COMPANY: Orchard Software (617/876-4608).
LIST PRICE: $59.95.

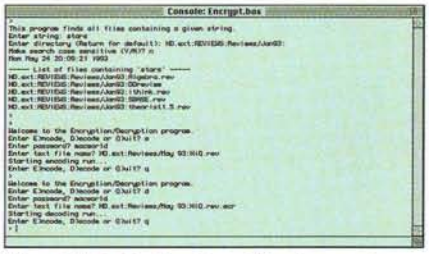
MW ★★★

WHEN STEVE JOBS FIRST SAW A PIONEERING graphical interface running on computers at Palo Alto, California's Xerox PARC, he saw an opportunity for a computer that wouldn't require you to remember strings of cryptic commands and deal with painfully short file names. Needless to say, this vision resulted in millions of Macs, as well as the interface style of all modern desktop computers.

And yet, the old type of interface could accomplish lots of tasks with a few keystrokes—most Unix hackers to this day delight in showing off single-line tricks that do more than a ten-minute flurry of mouse-clicks. Basically, CLImate is a small (70K) utility that provides a subset of Unix-like commands for the Mac environment. It uses a BASIC interpreter that includes input/output redirection and wild cards in file names, and the package includes an assortment of useful program samples. CLImate doesn't compete with AppleScript or UserLand's Frontier, which are really higher-level managers for applications and utilities. CLImate operates at the lowest system command level instead, and as such it needs only a tiny amount of memory and runs faster than the fancier products.

Even without a programming background, you'll be impressed at the programs you can write with just a little practice. Operating system commands include ALIAS, DIR, EJECT, FORMAT, RENAME, SHUTDOWN, STAT, and WHAT, among others, so you can automate anything you could do with a mouse, and then some. CLImate, for example, lets you construct the equivalent of aliases even if you're using System 6. You can make and display directory summaries in a huge variety of styles. You could write a little utility that asks for a password after your Mac has been running, and shuts it down if the right password isn't entered (you could protect your files, as well as determine if someone has tried to use your computer). Sample programs included on the disk let you launch sets of programs at the same time, back up your whole hard drive or selected parts of floppies, search files with a general-purpose text searcher similar to Unix's grep facility, and encrypt and decrypt files. Since the sample programs are written in BASIC, you can customize them endlessly—it's no problem to make a backup utility that fetches all work files for a given project between a pair of given dates and collects them onto a floppy, in their own folder with a custom folder name.

I hope the manual will be expanded so that the program will be accessible to Macintosh users who aren't used to thinking in terms of command-line flags. CLImate could be useful to space-limited PowerBook users; you could easily write a minimum-time backup utility that automatically shuts down the PowerBook when it's finished. With a little more documentation and a few more sample programs, Orchard will have an irresistible package.—CHARLES SEITER



'Tis a Gift to Be Simple CLImate supports very short, very fast programs that can manipulate all types of file access. The two programs in this screen search for text strings and encrypt files.

Address Express

Envelope Printer

PROS: Good print quality; simple software.
CONS: Crashes occasionally; flaky performance.
COMPANY: CoStar Corporation (203/661-9700). **LIST PRICE:** $795.

MW ★★

PRINTING ENVELOPES WITH THE Macintosh is usually, at best, a challenge; at worst, it means making a trip to that dusty typewriter you've been storing in the corner. Sure, you could choose to run the envelopes through the printer or use labels, but that can end up being more frustrating than productive.

CoStar's Address Express hardware and software combination tries to solve that problem. Its printer bin holds envelopes or labels and allows you to print them in a variety of ways. The good news is, it works. The bad news is, getting it to work is harder than it should be.

The Address Express package comes with two pieces of software and the printer, which is slightly smaller than Apple's Personal LaserWriter. The Ad/Ex Online extension adds a menu to your applications and lets you access major printing functions (such as preview), choose templates, and find addresses automatically from within almost any application.

Ad/Ex Editor is a stand-alone application that lets you design different templates for envelopes and labels. It has a simple interface and is easy to learn. You can specify various messages and return addresses and include the correct postal bars on your envelopes.

The printer itself is a thermal inkjet, and its print quality using TrueType fonts approaches that of the Apple StyleWriter. The Address Express prints approximately three envelopes a minute, and the tray holds 100 envelopes, 150 labels or cards, or 75 single-sheet folded mailers. The tray is not large enough to print 8½-by-11-inch paper.

Although the pieces of the package function well together, each of them is either more complicated or less reliable than I'd like. In Ad/Ex Editor, using templates requires one more step than seems necessary: after designing a template, you must first save and then install the template—there's no option to install automatically when saving.

Print quality is generally good, though sometimes printed words were scrunched at the bottom of the envelope, and at other times whole lines were distorted.

But my biggest problems arose when I *wasn't* using the product. When the Address Express was selected in the Chooser and I tried to print a document that was not formatted for the printer, my Mac experienced bus errors and I had to restart it. (This happened while I was trying to print from Microsoft Excel, 4th Dimension, America Online, and QuickMail.) The Address Express did not provide an error message explaining that the document I was trying to print was not properly formatted. Regrettably, CoStar technical support was unable to provide a solution to this problem. At other times, when I wanted to print to the Address Express, I had to tell the computer to print several times before the printer produced anything.

While I was not impressed with CoStar's technical support, the Address Express's manual is well written and clear. (It was written by *Macworld* contributor Owen Linzmayer.) The Address Express requires 2MB of RAM, a hard drive, one free serial port, and System 6.0.5 or later.

The Address Express does not completely solve the Mac owner's envelope-printing dilemma. If you need to print envelopes and are willing to pay $795 for the privilege, even if it's accompanied by flaky performance and system crashes, give the Address Express a try. If not, it's manual-feed time again.—JOANNA PEARLSTEIN

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Blackjack Trainer

Blackjack Training Program

PROS: Helpful—to those who care; allows for a good deal of customization. **CONS:** A few small bugs; not enough counting-strategy drills. **COMPANY:** ConJelCo (412/492-9210). **LIST PRICE:** $75.

MW ★★★

HOW DO CASINOS MAKE MONEY ON blackjack? When you play craps or roulette, the odds strongly favor the dealer. With blackjack, the odds actually favor you—when you make the right choices.

In blackjack, the basic choice is between hitting (asking for another card) and standing (keeping your hand as is). You win if you get closer to 21 than the dealer does, without going over. If you're mortal (if you aren't, skip the rest of this review) you probably can't assimilate your information quickly enough to always make the right choice. Worse, hitting and standing aren't your only options. You can also split, double, or surrender.

The two tools that gamblers use in order to choose correctly are the basic strategy and the count. The basic strategy tells you how to play based on only the cards you can see: your cards and the dealer's up card. The count is a way of keeping a tally of the cards that have been used. The count tells you when to stick with the basic strategy and when to ignore it.

Blackjack Trainer from ConJelCo is designed to help you learn these strategies by rote, so that you don't have to think about them when your money's in jeopardy. The program is really for people already familiar with counting strategies. It's best when used in conjunction with a book on blackjack. The manual suggests some titles, and most are available in bookstores.

The program allows you to play a standard game of blackjack, customizing the rules via a simple dialog box with check boxes next to the various options you might encounter. You just check each option on or off. The program beeps when you've made a mistake, and an optional dialog box tells you what you did wrong.

There are four drill modes. In the strategy drill you see only your two cards and the dealer's up card; you decide how to play and the computer either corrects you or moves on, keeping the same up card until you change it. Another drill tests you by dealing pairs of the same card, and a third tests you on *soft* hands—hands that include aces. These drills are useful for learning the basic strategy, but they don't help you learn when to stray from it, because they don't use the count. Knowing when and when not to stray from the basic strategy is what tips the odds for a really good blackjack player, so this is a serious flaw.

In the fourth drill, cards parade by, and you try to keep track of the count. At any time, you can stop the parade and check to see if your tally matches the computer's tally. The practice is helpful, but only for learning to keep the tally, not for learning how to use the count strategically.

Blackjack Trainer allows you to create and test your own strategies. You simply alter the standard strategy tables. The computer then plays hundreds of hands, one after the other, following your strategy and keeping a track record. You can see how a strategy performs in any number of hands. The program also comes equipped with a number of classic strategies, to learn or test.

I found a few bugs in the program, ranging from the minuscule (a check mark is supposed to indicate which drill mode you're in, but it doesn't work) to the relatively trivial (infrequently when you ask for a hit the computer reacts as though you wanted to stand).

So, to buy, or not to buy? You have to be awfully serious about blackjack to really need Blackjack Trainer, but if you put it to good use, you might win back your $75.

—GIDEON YAFFE

Indiana Jones and the Fate of Atlantis

Adventure Game

PROS: Realistic sound track and graphics; arcadelike action. **CONS:** Copy protection; strong gender bias. **COMPANY:** LucasArts Games (415/721-3300). **LIST PRICE:** $59.95.

MW ★★★

IN INDIANA JONES AND THE FATE OF Atlantis, one of the newest LucasArts adventure games for the Mac, the whip-wielding archaeologist goes looking for the mythical city of Atlantis and, with your proper guidance, finds it armed to the gills with magical technology and Nazi stooges.

Fate of Atlantis is three games in one. Early on, you join forces with psychic channeler Sophia Hapgood, a believer in the existence of the suboceanic society. After you and Sophia acquire a handful of treasures and clues, you make a decision: continue working with Sophia (the Team path), set out on your own (the Wits path), or abandon Sophia for a life of action and danger (the Fists path). Each leads to Atlantis but yields different obstacles and puzzles. If you save just before you decide, you can return after one path and play the other two.

Each path has its own arcadelike touches. On the Fists path, a parade of Nazi guards are itching to best you in a fair fight. You attempt to deck your man before he decks you. The entire game rests on the outcome of each fight; if you lose, the guard turns you over to the authorities, who invariably shoot you on the spot. On other paths, you have to ride a camel past a variety of Nazi gunmen, drive a car in hot pursuit of kidnappers in Monte Carlo, steer a balloon by venting off helium and dropping ballast, and navigate a submarine filled with enemy sailors into a small entryway on the ocean floor.

Fate of Atlantis goes a long way toward creating realism. After entering a pitch-black room, the screen slowly brightens as if your eyes are adjusting to the light. When you walk down dark hallways, the torchlight moves with you. The sound track always enhances the events on screen.

If this game sounds like the perfect gift for a youngster, bear in mind that the game is astonishingly sexist. Sure, Indy's a man's man, a product of another generation, and sexism is part of his personality. But poor Sophia—the only female character—has neither a strong personality nor the ability to be a match for the wily Indy. She's hopelessly inept and a perpetual victim. When she's not following behind Indy like a subservient wife, she's being kidnapped, trapped, or possessed. Her attempt to pull off a ruse fails, she refuses to save herself from certain imprisonment, and she falls into Indy's arms at the smallest provocation—in short, she's a terrible role model. Too bad there's no option to play Sophia and watch Indy make a fool of himself.

If the gender bias doesn't bother you, you'll love the colorful graphics, the witty repartee, and the engaging story line. You won't love the copy protection, but unlike with previous LucasArts products, it manifests itself only during the first portion of the game. Combined with a hint book, Fate of Atlantis is a diverting experience.

—DEKE McCLELLAND

Get a Grip, Sophia In this composite screen shot, Indiana Jones vanquishes the spirit of a onetime king of Atlantis to save the helpless Sophia.

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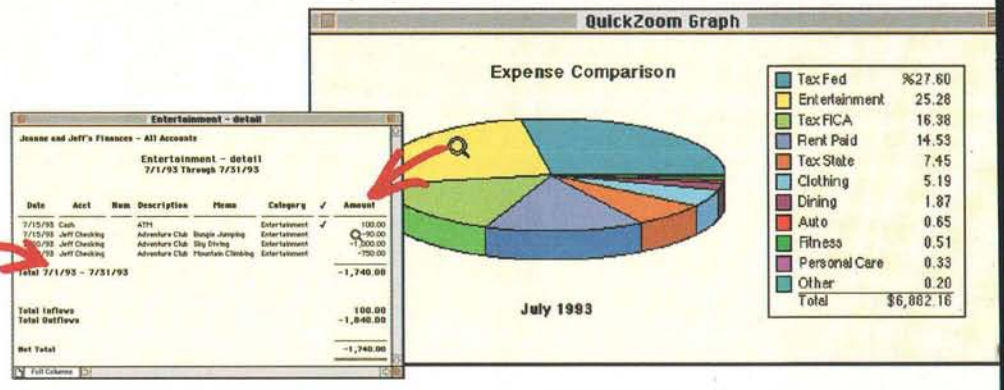

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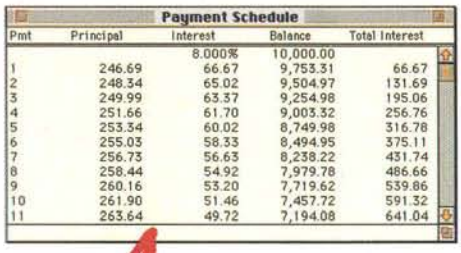
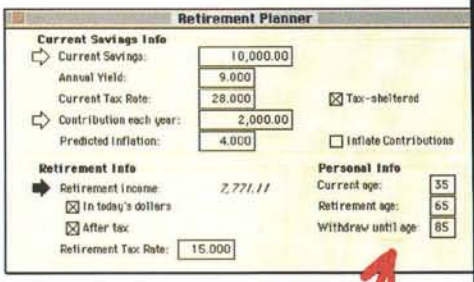


Track your loans



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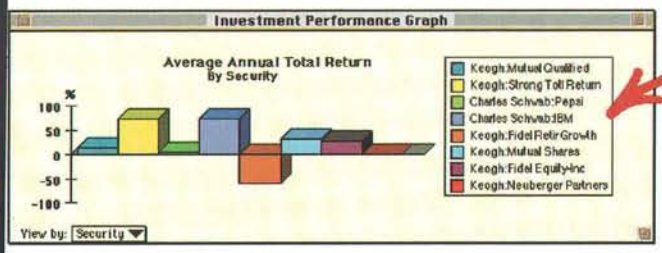
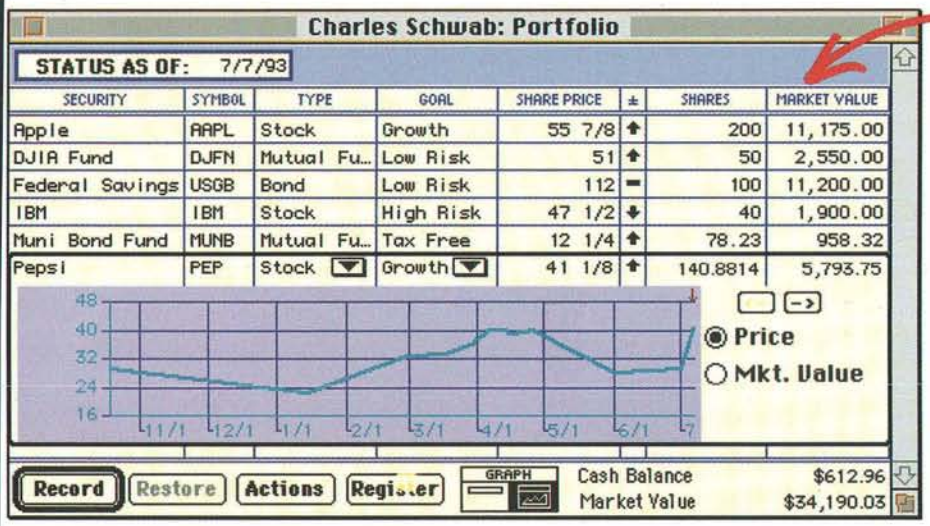


graphs

Track investments



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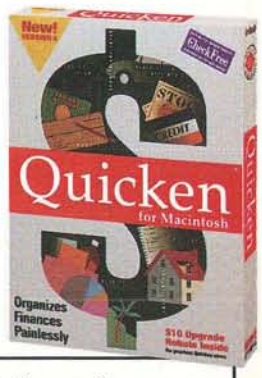

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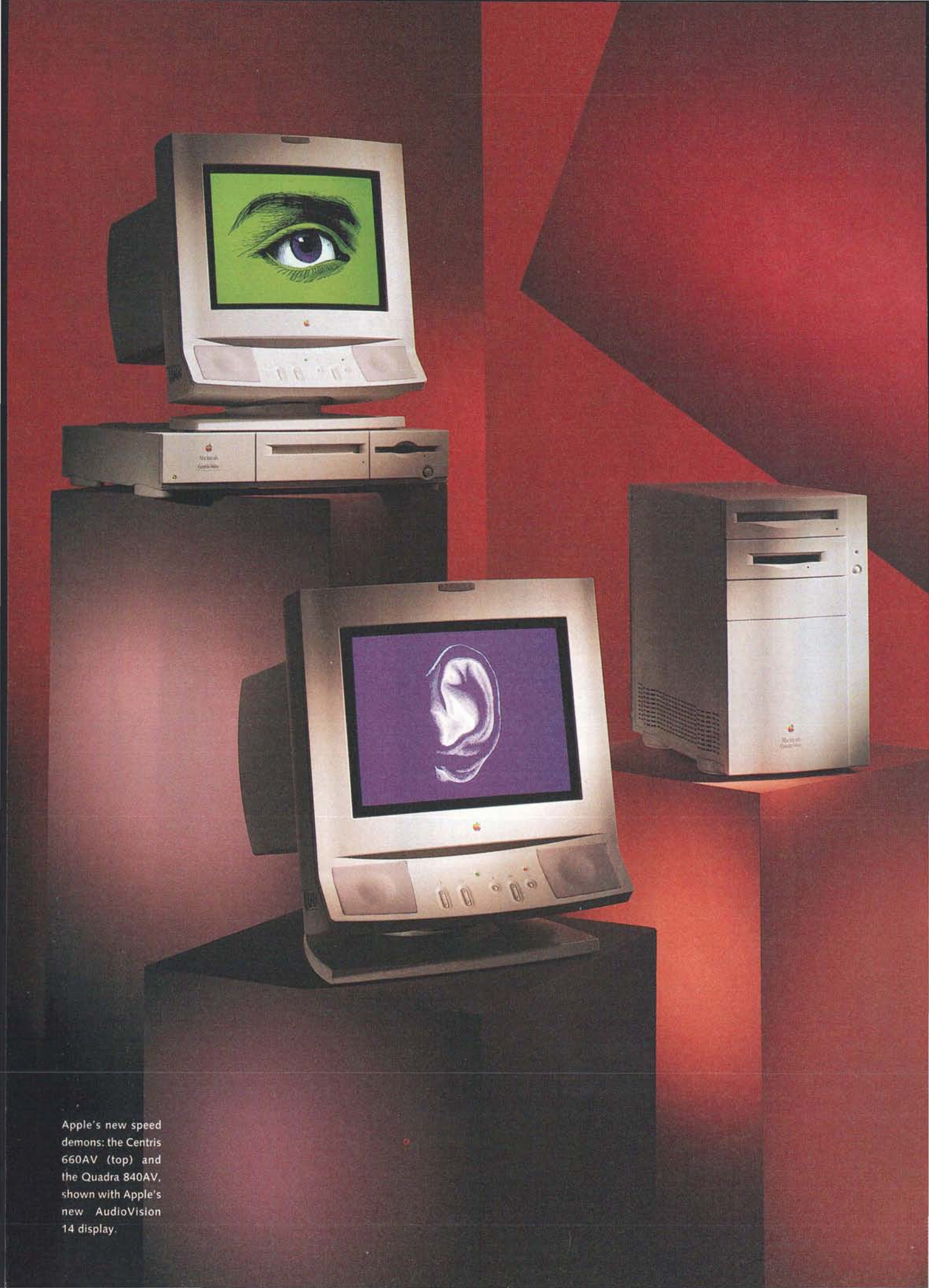


Apple's new speed demons: the Centris 660AV (top) and the Quadra 840AV, shown with Apple's new AudioVision 14 display.

Apple's new Centris 660AV and Quadra

840AV set new standards for

desktop telephony, sound, and video

THE AV MACS

by Jim Heid

MW LAB

Many of Apple's latest Mac introductions have stressed economy over innovation. That kind of progress is important in today's cutthroat, cut-rate computer industry, but it's disappointingly distant from the engineering innovations that have often set Apple apart from the DOS world. The last time new Apple products blew my socks off was in 1991, when QuickTime and the PowerBooks were unveiled.

My feet are bare again. Apple's latest Macs can do things no other Mac or comparable DOS PC can, at least not without four figures' worth of add-ons. The Centris 660AV and Quadra 840AV can send and receive faxes and serve as telephones and answering machines. The AVs can record QuickTime movies from a camcorder or other video source. They can send the Mac's screen image to a video recorder or a TV set. They can record and play audio with the fidelity of a compact disc. They can talk—and they can listen, with remarkably effective voice-recognition and -synthesis features. And they're the fastest high-end (840AV) and midrange (660AV) Macs ever.

The new AV Macs fuel two of the hottest trends in computing: the growing popularity of time-based data such as video and sound, and the increasingly cozy relationship between the personal computer and the telephone. The new machines also point to the not too distant future, when your mouth and ears will become full partners with your hands and eyes in interacting with a computer.

Who needs these machines? Technology buffs and people who need top performance—publishing pros who work with large Adobe Photoshop images, for example. But the AV Macs also provide appealing features for business presentations; sound and multimedia projects; users with physical disabilities; and telephone, fax, and modem junkies.

The Centris 660AV is the high-speed cousin of the compact, single-slot Centris 610. The Quadra 840AV is a senior sibling of the Quadra 800. Both new Macintoshes are priced to sell: $2489 for the 660AV, and $4069 for the 840AV. (These prices reflect the base configuration, with 8MB of RAM, a 230MB hard drive, 1MB of VRAM, and Ethernet.) I'll examine the details of and differences between each model later, but first, let's explore the new technologies they share.

PHOTOGRAPHS BY MARK JOHANN

Time Machines

Several new hardware and system software components work together to give the Centris 660AV and Quadra 840AV their capabilities. On the hardware side, the most noteworthy new residents on each machine's logic board are an *analog-to-digital* (A/D) converter circuit, which converts continuously varying signals, such as sound waves, into 1s and 0s; and a *digital signal processor* (DSP), a microprocessor designed to manipulate, convert, and modify streams of digitized sounds and video signals. But where a general-purpose microprocessor accomplishes jobs in its own good time, a DSP chip is designed to do its work in real time—for example, as you're talking into a microphone.

A/D converters and DSP chips aren't new. They were in Next computers, and they're available for existing Macs on digital-audio products, such as Digidesign's Audiomedia II. These products use Motorola's 24-bit DSP56001 chip, but for the new AV Macs, Apple reached out and touched a different supplier: AT&T. The AV Macs contain a 32-bit AT&T 3210 DSP chip; in the Centris 660AV, the chip runs at 55MHz; in the Quadra 840AV, it sizzles at 66MHz.

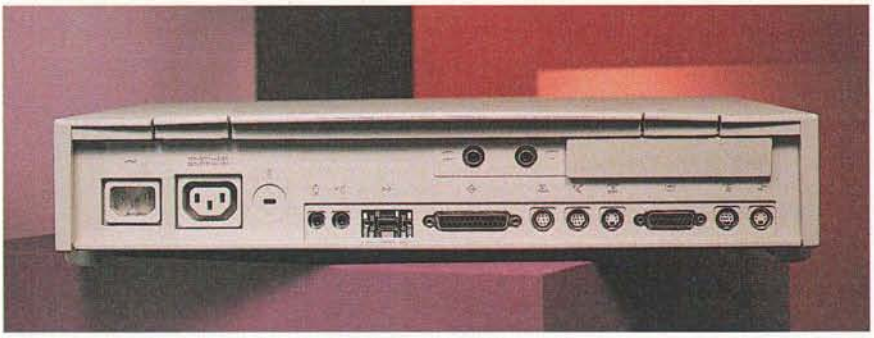
Apple chose the 3210 partly because it is a 32-bit processor (and it is therefore able to handle data more quickly than the 24-bit Motorola chip) but also because AT&T has developed a large library of signal-processing software routines for data- and fax-modem and voice-recognition functions.

This software gave Apple a head start in developing the system software that drives the DSP. It also lets the AV Macs' DSP chips enter the mainstream of business communications instead of simply providing the sound- and image-processing functions to which third-party DSP boards have traditionally been limited. The DSP and its system software form the Apple Real-Time Architecture (ARTA). ARTA manages the DSP's functions and serves as the intermediary between the DSP and the Mac's system software.

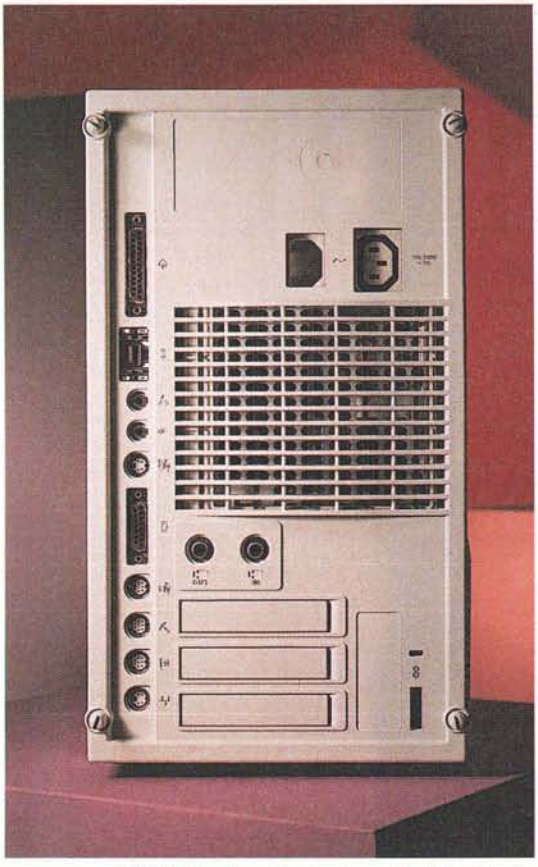
ARTA is the heart of the AV Macs' most impressive capabilities. It's also the driving force behind a new, high-speed connector called the GeoPort. The GeoPort, included with both new Macs, is designed for high-speed telephony, voice mail, fax and data transmission, and teleconferencing.

The GeoPort itself is a simple, 9-pin connector; to attach an AV Mac to the phone system, you need an adapter box called the GeoPort Telecom Adapter. About the size of a paperback book, this box contains A/D and D/A converter circuits as well as phone-line interface circuitry—a simple interface between the DSP circuitry and the telephone system. Like a modem, the GeoPort provides two RJ-11 jacks: one connects to the phone line and the other accommodates a telephone. Plug in this $129 adapter, and your AV Mac suddenly has a 9600-bps data–and–send-and-receive fax modem that is compatible with most communications software—as well as a voice telephone and answering machine.

The GeoPort Telecom Adapter uses the Express Modem software that drives the modems in the latest PowerBooks. Because much of the modem is implemented in software, you have roughly half a megabyte less RAM free when the modem is active—one reason why both machines come with 8MB of RAM.



660AV Ports The back panel of the Centris 660AV includes the following ports (from right to left): ADB, super VHS video in, RGB video out, super VHS video out, phone/serial, printer, SCSI, Ethernet, audio out, microphone, and at the top, composite video in and out.



840AV Ports The back panel of the Quadra 840AV includes the following ports (along left side, from top to bottom): SCSI, Ethernet, audio out, microphone, super VHS video out, RGB video out (at the right of this port are composite video in and out), super VHS video in, phone/serial, printer, ADB.

A Phone in Your Mac

Both AV models include a simple application, ApplePhone, that lets you make calls and turn the Mac into an answering machine (see "Apple Phone"). But you might also need a second hard drive—a one-minute message uses nearly 1MB of disk space.

Third parties are developing more sophisticated telephony applications. Cypress Research Corporation, for example, is working on an AV version of its PhonePro application, which lets you click and drag icons to create the labyrinth of menu options for which voice-mail systems are famous (and infamous). The current version of Phone Pro requires additional hardware—the AV-specific version will not.

For voice telephony, the AV Macs include a small, newly designed external microphone (which doesn't work with existing Macs other than the Color Classic). The new microphone picks up sound from one direction only, rejecting ambient noise.

In informal tests of the ApplePhone application, the new mike produced higher fidelity than a conventional telephone receiver. Fidelity is best when you hold

the mike a few inches away from your mouth, but is surprisingly good at greater distances. For hands-free phoning, though, you will want the new AudioVision 14 monitor, which contains a built-in microphone as well as a pair of great-sounding speakers (see *News, Macworld*, September 1993).

Apple's GeoPort Telecom Adapter works with conventional analog phone systems—the kind your house has. Different adapters are required to connect the GeoPort to office PBX (private branch exchange) systems or ISDN (Integrated Services Digital Network) lines. Apple expects vendors of business phone systems to introduce PBX adapters later this year or early next. Apple or a third party should release an ISDN adapter in the same time frame.

Thanks to the speed of the GeoPort and the DSP chip, an AV Mac can handle voice and data telephony at the same time. In theory, you could talk with a colleague using ApplePhone and send or receive a fax at the same time. In practice, however, the Apple Telecom Adapter can connect to only one phone line at a time. Apple expects other companies to introduce multiline phone connectors for the GeoPort.

Video Output: The Mac on TV

Among the myriad ports on the back of an AV Mac are video-output and video-input jacks. You can connect the video-output jack to any television set with a composite-video or S-Video input. (Most of today's TV/monitor hybrids provide one or both.) You can then use the Monitors control panel to route the Mac's video signal to the television set.

Why bother? For one thing, you can use a conventional TV set to show presentations using programs such as Microsoft PowerPoint and Aldus Persuasion. Many corporations and large institutions use large monitors that cost $7000 or more for presentations. Roughly the same amount of money buys a 35-inch TV set *and* a Quadra 840AV.

If you want to send a presentation to the branch office, attach the AV Mac to a video recorder and tape the presentation. Better yet, to record a live presentation, attach the TV's video-out connector to the video recorder. This lets you use the TV as a monitor and record the presentation at the same time. You can also use the Mac's mike to record a voice-over and even mix the voice-over with a QuickTime movie's sound track.

The NTSC (standard TV format) video that the AV Macs produce isn't, in Apple's words, "production-studio quality," but it looked very good to me—excellent color and no flicker. The machines also support the PAL video standard that's used in western Europe, Africa, and Asia. For France, which uses a standard called SECAM, you'll need a PAL-to-SECAM converter, a common video accessory in that country.

COMPARE THE AV MACS TO VIDEOCONFERENCING SYSTEMS **THAT COST** UPWARDS OF $5000 AND DON'T RUN MICROSOFT **WORD OR EXCEL**

When you switch to NTSC or PAL video, you lose the outer edges of the Mac's screen, including the menu bar. This is because television sets overscan (project a larger image than will fit on the tube), while computers traditionally underscan (project a smaller image in order to show every pixel). For showing and taping presentations, this won't be a problem unless you place text or important graphics at the edges of the visuals. In that case—or if you want to show the Mac's menu bar for training purposes—a control-panel option shrinks the screen image to 512 by 384 pixels instead of the normal 640 by 480.

Easy QuickTime

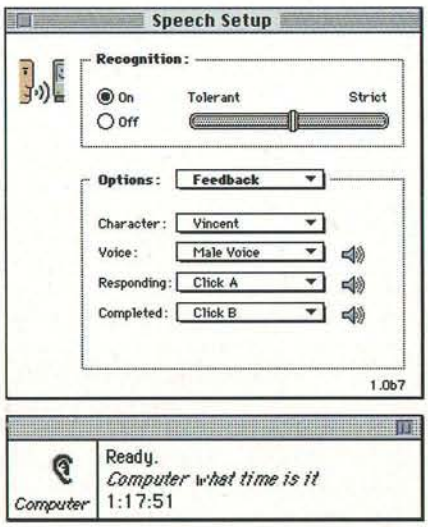
An AV Mac's A/D circuit and video-input connector let you digitize QuickTime movies without a third-party board. Both models' ROM chips include a video-digitizer that enables programs that support direct video input (such as Adobe Premiere and DiVA VideoShop) to record QuickTime movies. At a QuickTime movie size of 160 by 120 pixels, both machines can digitize roughly 10 to 20 frames per second, depending on the speed of the hard drive and other factors.

An AV Mac can display full-screen video at the standard broadcast frame rate of 30 frames per second. Attach a video source to an AV Mac, start up the Video Monitor application that comes with the machine, and the screen becomes a TV monitor. You can resize the video window, switch to a different application, and even hold down the mouse button—without missing a frame or giving your image the jitters they get on older Macs.

The Video Monitor program also enables you to grab a frame of video and save it as a 24-bit PICT file. Combine this capability with a video camera and you have an electronic photography system. Apple is working on a pint-size video camera that could be used in electronic photography or videoconferencing applications. The camera, which can sit on top of the Mac's monitor, should be available by the end of the year.

The DSP chip doesn't play a direct role in an AV Mac's video input/output capabilities. These features are provided by a new video subsystem located on the computer's logic board (see "Quadra 840AV Logic Board"). However, with appropriate codecs (QuickTime's compression-software modules), the DSP chip could handle video compression in order to reduce the storage requirements of QuickTime movies.

If a colleague also has an AV Mac and you've both attached video cameras to your machines, you can see each other as you chat. Compare this with dedicated videoconferencing systems that cost upwards of $5000—and can't run



Now Hear This The AV Macs offer a range of speech-recognition controls (top), including tolerance level, which offers better recognition if ambient noise is low, and a variety of synthesized voices. A command register (bottom) records your voice commands for verification and reference.

AV Macs Beat Earlier Models

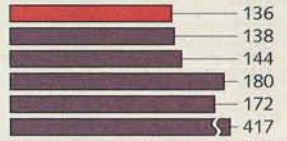
Fastest result for each test. Times are in seconds. Shorter bars are better.
Products are listed in order of overall performance from fastest to slowest.

Processor Tasks

We ran tests that show how the different processors perform. These included recalculating a spreadsheet, running an Adobe Photoshop unsharp mask, and sorting a database (in RAM).

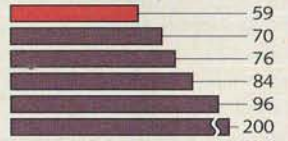
Drive-Access Tasks

We ran tests that show how well each computer performs tasks that rely heavily on the hard drive. Our tests included opening and saving files and sorting a database (on disk).



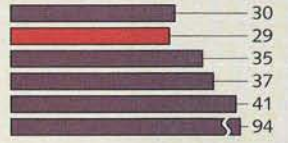
Math Tasks

We ran tests that depend heavily on a math coprocessor to achieve reasonable performance, including recalculations involving scientific functions.



Display Tasks

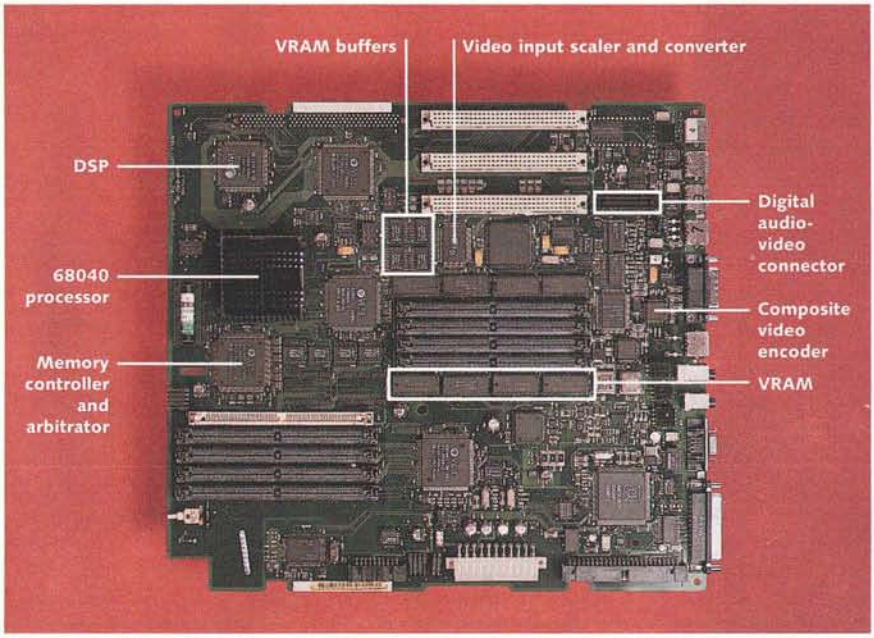
We ran tests that show how well each computer performs on tasks that depend heavily on the speed of screen redraw. These included scrolling tests in Microsoft Word and Excel.



These tests show prototypes of the Quadra 840AV and the Centris 660AV to be the fastest Macs in their respective product lines. The Centris 650 (not shown) performs at about the level of the Quadra 700. All machines were equipped with 16MB of RAM, were running System 7.1, and were using an Apple 14-inch color monitor. All tests were done with AppleTalk off, 32-bit addressing on, virtual memory off, the disk cache set to 32K, and monitors set to 8-bit mode.

Microsoft Word and Excel. The AV Macs bring teleconferencing to the rest of us. Time will tell how many of us want picture phones.

The DSP chip's prowess at performing calculations will also allow the AV Macs to appeal to Adobe Photoshop users. Spectral Innovations is creating Photoshop image filters that take advantage of the DSP to boost filtering speeds. Such products aren't likely to offer the same degree of performance as a DSP accelerator designed specifically for Photoshop (such as Radius's PhotoBooster, a DSP board that uses two AT&T 3210s, or a DayStar Digital product [tentatively called the Charger 040], which uses an AT&T DSP16A chip—both products should be available by the time this article appears), but they do illustrate the versatility that an on-board DSP offers.



Quadra 840AV Logic Board The most important innovation for the AV Macs is the insertion of a digital signal processor (top left) to increase speed and to handle telephony and audio-video tasks.

The Sound of Mac

The AV Macs' A/D converters and DSP chips make them formidable audio-production and multimedia machines. Instead of the table-radio-quality, 8-bit, 22kHz audio that stock Macs provide, the AV Macs can record and play much better—their 16-bit, 44kHz sound matches compact disc specs.

The AV sound circuitry sports a signal-to-noise ratio of 85 decibels (db); a CD's signal-to-noise ratio is barely better—about 90db. (A high-quality stereo cassette deck might have a signal-to-noise ratio of 60db.) Therefore, a recording studio will probably not use an AV Mac to produce a final master for a CD, but professional and well-heeled amateur musicians may want AV Macs in their homes or rehearsal studios. University music departments will also love them, as will hard drive manufacturers—one minute of stereo CD audio uses 10MB of disk space.

The AV Macs include a new Sound control panel that has a mixer window, which lets you adjust the relative volume of beep sounds, incoming audio, and audio being played from a CD. Much of the AV sound circuitry can be controlled through software. Say you're listening to a CD and your phone application rings. The phone application could turn down the CD sound and turn on the Mac's microphone.

Another of a DSP chip's talents is the ability to modify sound in real time. Expect to see sound-editing applications offering sophisticated reverberation, echo, and equalization features. (Such features are available now in programs that use third-party DSP hardware.) Even the new Sound control panel offers some of this: a fun option adds reverb to system-error beeps—the Mac sounds like it's in a cavernous stadium.

Speak Up, Mac

The Mac has been able to talk since its debut—it introduced itself at its unveiling in 1984, thanking Steve Jobs for being "like a father to me." But the speech, created by a system extension called MacinTalk, was barely intelligible.

The speech-generation capabilities of PlainTalk, Apple's new voice-recognition and speech-generation technology, work dramatically better. A new system extension, Speech Manager, provides two standard voices, male and female, each in two quality settings (a compressed version uses less memory but sounds somewhat muffled and noisy). Speech Manager can also synthesize a wide variety of voices, from children's voices to a Darth Vader–like computer voice. Inflection is good, although you'll never mistake your Mac for Dan Rather or Connie Chung.

The Speech Manager does not require an AV Mac—any Mac from a Plus on up can run it, although you should expect high-quality voices only on machines with a 68020 or faster processor. At present, Speech Manager supports English only.

PlainTalk's text-to-speech capabilities enable the Mac to verbally report error messages or other information and to read documents aloud. The software does a remarkably good job with words and abbreviations whose pronunciation can vary. It passed this acid test: "As we close on our close competitors, I project that the record project will record record profits." And speaking of close competitors, although PlainTalk has no trouble with *microprocessor*, it pronounces *Microsoft* as *mickro-sowft*. It also falls flat with *typeface*, pronouncing it *tipaffiss*. Fortunately, developers can create pronunciation dictionaries to improve PlainTalk.

Text-to-speech software of this quality obviously offers dramatic benefits to users with vision problems, but it also has potential value in business and general education. Imagine dialing your Mac and having your electronic mail read to you. Consider educational software talking a child through a problem, or offering encouragement or congratulations. Unfortunately, voice recognition does not work as well with children's voices, according to Apple.

For a while, you will have to imagine these things, because few existing programs support text-to-speech. Microsoft has developed a plug-in module for Word that enables you to select text in a Word document and have it read. At least 20 other vendors will add text-to-speech features to their products by the time you read this. Those include CE Software (QuicKeys 3.0), Fractal Design (Painter), WordPerfect (WordPerfect 3.0), Opcode (StudioVision), Passport Design (Passport Producer Pro), and Great Wave Software (Kids Time and NumberMaze) as well as products from SuperMac and Radius. And the AV Macs include a speech-savvy version of TeachText, the simple text editor included with all Macs.

Talking Back to the Mac

You've probably said a few things to your Mac in its lifetime. An AV Mac can respond. The AV Macs use their A/D converters and DSP chips to control the Mac and its programs through spoken commands.

Voice recognition isn't new. Articulate Systems has been shipping its Voice Navigator series of products for several years. But PlainTalk's voice-recognition capability represents a significant advance. Previous voice-recognition products have required extensive training—you sit in front of a mike and recite dozens of words a few times so that the Mac can memorize the words' waveforms.

PlainTalk requires no training. Apple digitized nearly 1000 North American English speakers representing a spectrum of dialects. The result is a database describing the frequency characteristics of various sounds. Frequency patterns of many spoken sounds are generally consistent regardless of dialect or inflection.

When you issue a spoken command, the DSP dissects the digital data produced by the A/D converter and analyzes it to determine the volume of various frequencies. It then compares the results to its knowledge of the human voice—a process that involves making tens of thousands of comparisons and decisions within the span of a few milliseconds. (If that sounds impressive, remember that a baby can do the same thing—and detect emotion, too. If anything, a session with PlainTalk will renew your appreciation for the miracle of spoken language.)

Like speech generation, voice recognition presents the potential for dramatic benefits for the disabled as well as important implications for mainstream business productivity. You can choose commands and activate palette tools by speaking—no journeying up to the menu bar or over to a tool palette. So what, you say? A 1990 study conducted at the University of Virginia showed productivity gains of between 21 and 56 percent in drawing applications. And if you've just typed your wrists sore, wouldn't it be convenient to say, "Computer, select sentence two. Computer, font Times Bold."

Like a dog trainer, you precede spoken commands with a name—*computer* by default, although you can change that (see

BEHIND OUR TESTS

MW LAB Macworld Lab looked at several aspects of computer speed involving hard-drive access, display response, CPU tasks, and floating-point calculations. Drive-access tests included opening a 1MB spreadsheet from Excel 4.0, a 250K Word 5.0 document, and a 16MB Photoshop 2.0 file; sorting a 500K FileMaker Pro 1.0 database; and saving to an EPS file and making separations from a QuarkXPress 3.1 file on an external 230MB hard drive. Scrolling tests—including page scrolls in a 153-page Word 5.0 document and line scrolls in a 280-row Excel 4.0 document—showed how well the CPU performs on tasks that depend heavily on screen redraw.

To test the new AV Macs' central processor speed, we performed recalculations of an algebraic spreadsheet from Excel 4.0 that included standard business functions (such as multiplication and division), performed find-and-replace operations in a lengthy Word 5.0 document, resorted the 500K FileMaker Pro database in memory, and conducted Photoshop unsharp mask operations. To assess the machines' floating-point performance, we used a huge Excel 4.0 spreadsheet formula that involved many transcendental functions.

For all tests each machine used 16MB of RAM, ran System 7.1, and used an Apple 14-inch color monitor set to 8-bit mode. All tests were done with AppleTalk off, 32-bit addressing on, virtual memory off, and disk cache set to 32K.

We also took a subjective look at the new audio-visual features. Voice recognition was impressive, but far from perfect. It worked best when testers spoke directly into the microphone in a quiet room. In a crowded room, some testers didn't speak loud enough to compensate for background noise.

Speakerphone audio was sharp and clear, even from a few feet away, and we did not encounter the occasional delays common on a standard speakerphone.—**Macworld Lab testing supervised by Danny Lee**

"Now Hear This"). You can also disable the name requirement, but you run the risk of errant commands. Imagine telling a coworker, "The factory shut down," and then turning to your Mac to find it's turned itself off. Actually, the AV Macs' mikes have a unidirectional pickup pattern that should prevent most such problems, but the name-before-command option provides a security cushion.

Voice recognition requires 2MB of RAM. (Add that to the 700K-to-2.6MB overhead required by text-to-speech, and you can see why both machines ship with 8MB of RAM.) The voice-recognition technology is built on the foundation of AppleScript, Apple's system-level scripting language. So to fully support voice recognition, a program must support AppleScript. At this writing, few programs do, although that small group has some big names, including Microsoft Excel, Claris's FileMaker Pro and MacProject Pro, Deneba's Canvas, Aldus PageMaker, and QuarkXPress. By building its voice-recognition technology on top of AppleScript, Apple has made it relatively easy for software developers to support both.

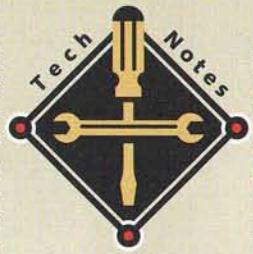
The Apple menu contains a Speakable Items folder in which you can stash files (or aliases to files) that you want to open via voice command. You can also create your own voice-activated macros using CE Software's QuicKeys utility. The AV Macs include a QuicKeys extension that lets you trigger macros with spoken commands. So even if you can't yet access every feature of your favorite programs with speech, you can implement common tasks such as scrolling, choosing commands, and activating palette tools. And PlainTalk lets you choose menu commands in any application that uses standard MENU resources. Most programs do, although Microsoft Word and Excel do not.

The AV Macs will not be able to recognize speech over the telephone—phone lines and phone mouthpieces do not provide the required fidelity. Also, the amount of signal processing required for voice recognition precludes using voice commands during a 9600-bps data communications session. And at this writing, Apple wasn't certain if speech recognition and faxing could take place simultaneously.

Fastest Macs Yet

In Macworld Lab tests conducted on prototypes, the Centris 660AV outpaced the Quadra 700 and nearly matched a Quadra 950 in some tests. The Quadra 840AV is, simply, the fastest Mac ever (see "AV Macs Beat Earlier Models").

HOW AV MACS DO TWO THINGS AT ONCE



The new AV Macs take a step toward solving a vexing problem of Macintosh computing—the inability to simultaneously process two or more complex tasks. Have you ever tried to recalculate a 10,000-cell Excel spreadsheet while converting a 15MB Photoshop file from RGB to CMYK? If so, you know that it takes as much or more time as if you had directed the Mac to complete the tasks one at a time.

The Macintosh Operating System uses *cooperative multitasking,* which splits processor time between applications sequentially. Think of it as a relay race where the CPU is a baton and the runners are applications. Only one application can hold the baton at a time. This makes using CPU-intensive features such as voice recognition and on-board video capture difficult at best. The 68040 cannot provide the computing power needed to handle both tasks without unacceptable degradation in performance. Imagine saying "Computer, open Chooser and select LaserWriter," then waiting more than 10 seconds for the Mac to execute your commands. That's too slow for a $5000 machine.

Apple's addition of the AT&T 3210 DSP chip in the new machines, along with a new operating environment called Apple Real-Time Architecture (ARTA), solves this problem for some functions. The DSP, with its 33-MFLOPS engine and 16.7-MIPS RISC ALU (arithmetic and logical unit), acts as a coprocessor. It also provides 8K of on-chip RAM and a serial port. All the code and data used by the various DSP functions is cached to the chip.

Unlike other DSP schemes, ARTA—not the DSP chip—controls what data enters the cache. Therefore the DSP can share the memory that is already available on the motherboard, eliminating the need for dedicated RAM to support the DSP chip. Without having to pass code between the DSP and dedicated RAM, the DSP and the CPU can work together efficiently.

The ARTA approach also allows the AV Macs to simultaneously execute two separate tasks—called *Realtime* and *Timeshare* events by Apple. Realtime events (also called isochronous functions), such as sound and video input/output, use only part of the DSP's bandwidth. Asynchronous functions, such as image compression or modem emulation, can be accomplished using the excess bandwidth of the DSP along with help from the CPU—hence the term *Timeshare.*

Theoretically, you could capture a QuickTime movie with sound while sending a file to your coworker at 14.4 bps over the modem. To aid this process, Apple has included a Digital Audio Video (DAV) port, affectionately known as Dave. With this 40-pin connector, audio and video can be passed directly through it to the DSP, leaving the CPU to go about its normal business. The telecommunications in the scenario could be handled through the GeoPort—the AV Macs' new high-speed port designed for this purpose.

DSP coprocessing therefore gives the Mac the ability to complete two tasks at the same time, as long as one of the tasks involves AV signal processing. But the AV Macs still cannot handle two CPU-intensive tasks—such as the complex Excel spreadsheet calculation and Photoshop conversion—simultaneously.—**Danny Lee**

Several new components in the AV Macs give the machines the potential to run even faster once application programs and the Mac's system software are adapted to take advantage of them. The most significant of these is a SCSI *direct-memory access* (DMA) chip, which allows data to move between a SCSI device and memory while the CPU performs other tasks.

With the SCSI DMA chip and the new SCSI Manager, the AV Macs support asynchronous SCSI operations. With this feature, the Mac can access several SCSI devices simultaneously—you could, for example, scan an image in one program while opening a file in another.

Asynchronous SCSI also promises to boost performance for network file servers and other disk-intensive operations as well as streamline the development of disk arrays. But again, for these promises to become realities, software

and hardware developers will have to adapt their software to support the new SCSI Manager, which runs on any 68040-equipped Macintosh. That restriction might annoy owners of faster 030-based systems, particularly people who bought the Mac IIfx in part because of its SCSI DMA chip.

The AV Macs also contain a new peripheral controller chip that manages the modem, printer, and built-in Ethernet ports, lightening the load on the CPU. As with the Mac IIfx's peripheral interface controller chip, System 7 doesn't take full advantage of the new chip's capabilities. Apple says a future version of the Mac's system software will, but we heard that when the Mac IIfx was introduced.

Hardware Extras

Hardware features of the Centris 660AV and Quadra 840AV resemble those of the Centris 610 and Quadra 800. The Centris 660AV can accommodate one 7-inch NuBus card or one Processor Direct Slot (PDS) card, while the Quadra 840AV provides three full-size NuBus slots and a PDS. Thanks to a new NuBus controller chip that supports NuBus-90, the latest and fastest version of the NuBus standard, the NuBus slots in both machines can transfer data two to four times as fast as the NuBus slots in earlier Macs. Both machines include a new, 40-pin slot—a Digital Audio Video (DAV) connector designed to accommodate a compression/decompression board.

Both machines also use the 72-pin SIMMs required by their siblings. The Quadra 840AV, however, requires 60ns RAM chips—the Quadra 800 uses 70ns chips. The Centris 660AV accommodates up to 68MB of RAM, while the Quadra 840AV houses up to 128MB. The Centris 660AV includes an 80MB hard drive, while the Quadra 840AV houses a 230MB drive. As for video, both machines include 1MB of video RAM (VRAM). The Quadra 840AV can accommodate another 1MB; with 2MB of VRAM, it can display 16.7 million colors (24-bit) on a 16-inch monitor and 32,768 (16-bit) on a 21-inch screen.

Given all the AV Macs' additional capabilities, you might wonder why Apple hasn't discontinued the Centris 610 and Quadra 800. One reason is that Apple rarely announces a machine's demise when introducing a new Mac that obviously replaces it.

But this time, there are better reasons to keep the Centris 610 and Quadra 800 on the active-duty list. Neither AV Mac supports A/UX, Apple's version of Unix. Sites that require speed and A/UX compatibility will want to stick with the Quadra 800. As for the Centris 610, it's likely to appeal to buyers who want a speedy, economical package and don't need AV features.

Apple will offer a 660AV upgrade for the Centris 610, and an 840AV upgrade for the Quadra 800. (Prices weren't available at press time. And remember: upgrades generally take a backseat to new CPUs at Apple, so expect to wait a while.) Third parties may also release ARTA-compatible DSP boards for NuBus-based Macs. Such boards would support CD-quality sound, but not voice recognition or telephony.

All in all, the latest Macintoshes represent a major advance in personal computers. Many of their features—video in/out, built-in fax/data modems, 16-bit, and 44kHz sound—have immediate value. The benefits of PlainTalk, videoconferencing, and SCSI DMA will arrive along with programs that fully exploit these features. Also, for video-digitizing and voice-mail functions to be practical—that is, for them to not fill your hard disk—you may want one of the hardware compression boards that third parties will develop for the DAV connector.

The AV Macs' fax, modem, and telephony features mesh well with Apple Open Collaboration Environment (AOCE), which provides standardized E-mail and messaging services. The new Macs' audio and video features make them dream machines for multimedia and audio production. PlainTalk opens the door to exciting educational software and to applications more effective for disabled users.

These computers aren't just specialized savants within the Macintosh line—they're the first look at a new and important approach to technology. Apple's PowerPC-based Macs, due sometime next year, eventually will also provide voice recognition and telephony as well as sophisticated video architectures. The PowerPC processors are fast enough to handle voice recognition and telephony without the help of DSP chips. In this sense, the AV Macs are blazing the trail for PowerPC machines, giving developers a chance to start weaving the new technologies into their programs, and giving consumers a view of what's ahead—and the incentive to remain with Apple. AV technology will be phased into all PowerPC lines over a period of two or three years, so 68040 AV Macs and PowerPC Macs—with and without AV features—should coexist for some time.

Even if you ignore their exotic capabilities, the AV Macs provide good performance for the price. Apple's engineering prowess and tight control over the Mac's hardware and system software—a grip other PC makers have yet to achieve—have again allowed the Mac to set initial standards by which similar products will be judged. **m**

APPLE'S POWERPC-BASED MACS, DUE NEXT YEAR, EVENTUALLY WILL PROVIDE VOICE RECOGNITION, TELEPHONY, AND VIDEO

ApplePhone This application functions as a keypad, volume control, and log for telephone calls.

Contributing editor JIM HEID has been working with (and talking to) Macs since 1983. He wishes he'd had an AV Mac when he produced the CD-ROM that accompanies his latest book, *Macworld Complete Mac Handbook Plus CD* (IDG Books Worldwide, 1993).

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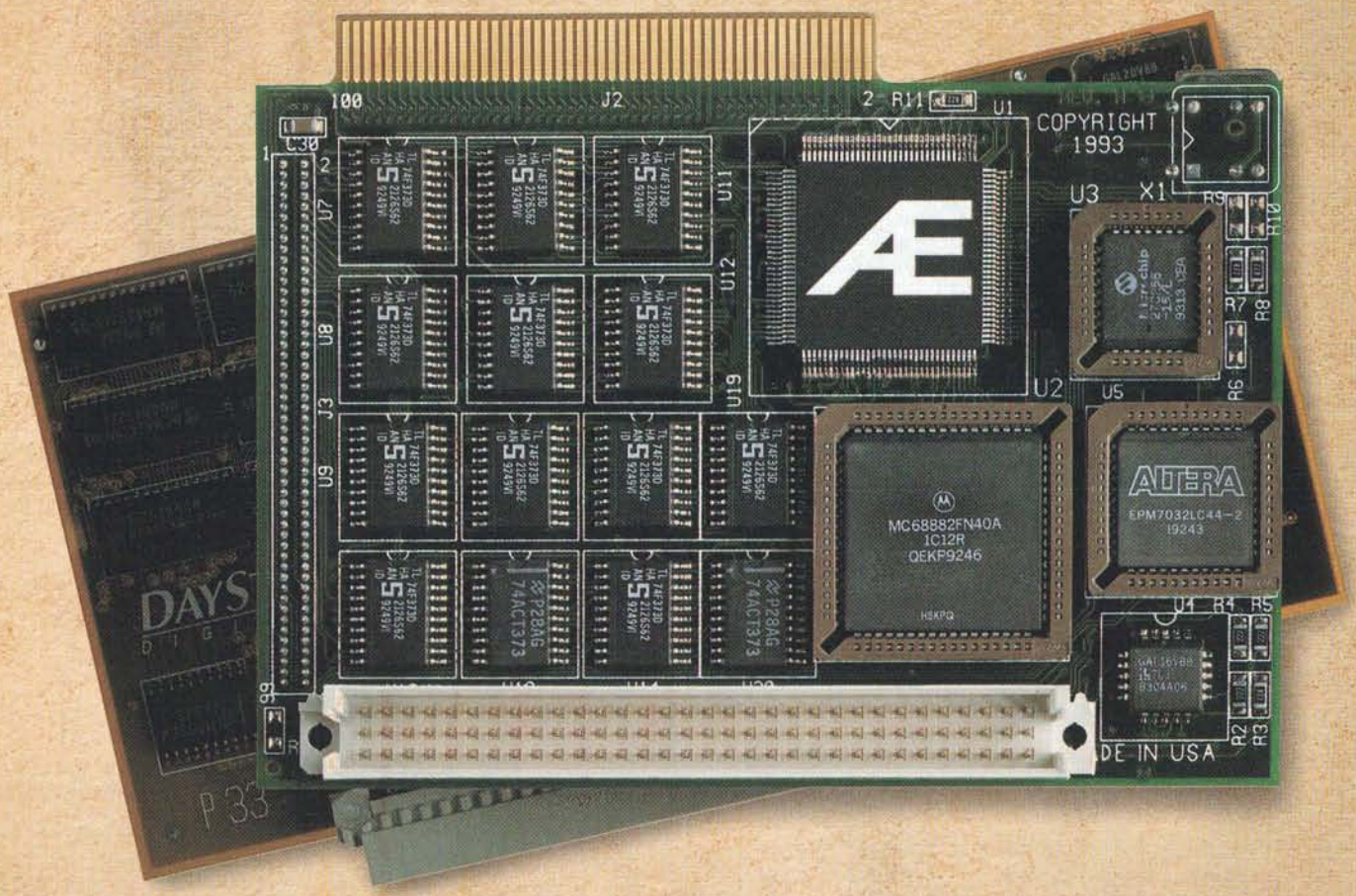

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		DAYSTAR	11.09	No	$698
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		DAYSTAR	2.52	No	$498
	40 MHz	AE	3.13	Yes	$449
		DAYSTAR	3.07	No	$698
68040 II, IIx, IIci, IIvi, IIvx, IIsi Performa 600 Series	25 MHz	AE	4.5	NA	$999
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	33 MHz	AE	5.0	NA	$1,199
		DAYSTAR	5.0	NA	$1,599
	40 MHz	AE	5.5	NA	$1,499
		DAYSTAR	5.2	NA	$2,399

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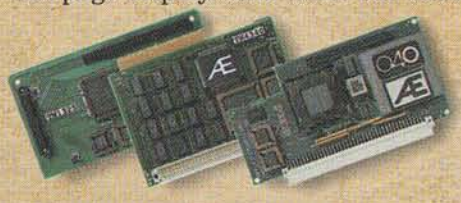

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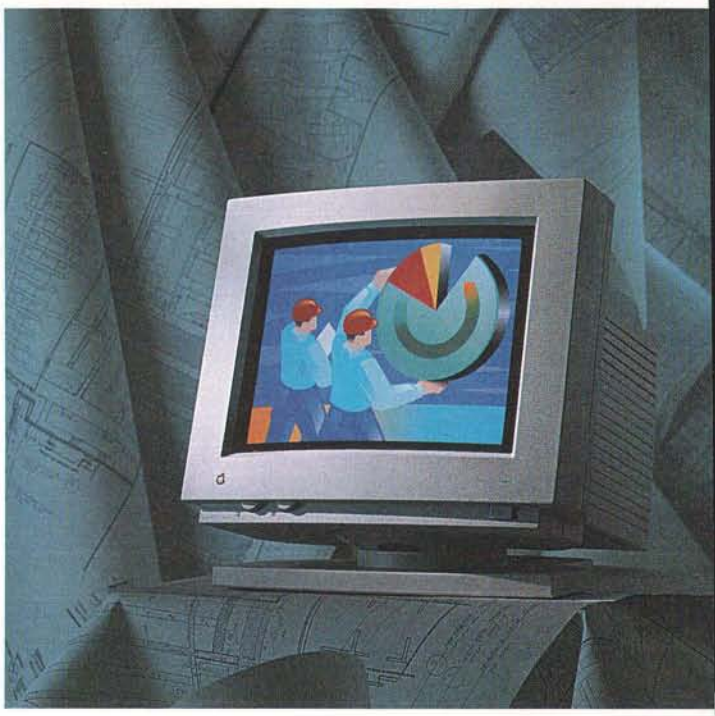
Circle 167 on reader service card

EXPANDING YOUR



BY DEKE McCLELLAND

APPLE—THE ORIGINAL PERpetrator of the postage-stamp monitor—is hoping the fortunate color-Macintosh user is sick enough of the confines of a 12- or 14-inch screen to buy into a roomier display standard. After reviewing 17 monitors from Apple and 14 other vendors, Macworld Lab can be counted among the true believers. The midsize 16-inch screen is ready for prime time.

In our testing, we looked at 16- and 17-inch color monitors designed to run at resolutions of 832 pixels wide by 624 pixels high. When compared with their 14-inch cousins, 16-inch monitors provide 30 percent more headroom and 30 percent more elbow room for a total of 69 percent more on-screen real estate.

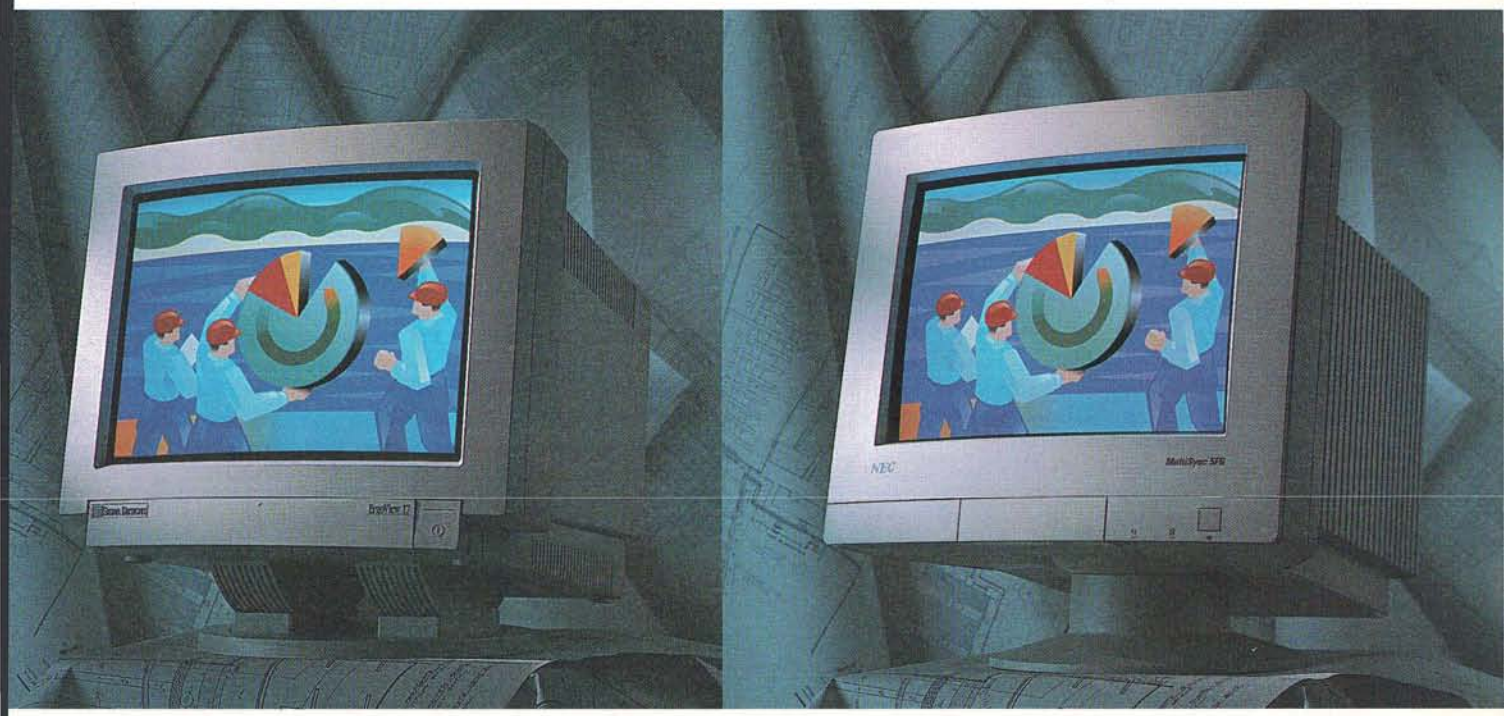
Street prices typically range between $1000 and $1300, and you need no extra video-display board if you own a Centris, Quadra, LC III (Performa 450), or any of the second-generation PowerBooks (160, 165c, 180, and 180c).

Many types of users can benefit from the greater area of a midsize monitor:

- If you spend most of your time using a word processor, you'll have room for another paragraph on screen—or two documents side by side.
- Number crunchers can expand the size of their spreadsheets by roughly 100 cells.
- A desktop publisher can view all but the extreme margins of a two-page spread at 75 percent

MW LAB

MACWORLD LAB TAKES A CLOSE LOOK AT MIDSIZE COLOR MONITORS



HORIZONS

PHOTOGRAPHS BY MARK JOHANN / SCREEN IMAGE BY HANK OSUNA

magnification versus 50 percent on a 14-inch monitor.

- If you dabble in image editing, you can view every pixel of a standard 4-by-5-inch photograph scanned at 160 dpi.
- Database managers can see the bigger picture, online enthusiasts can juggle more open windows, and presentation professionals can exploit larger screens.
- And absolutely anyone will have more room to position icons and aliases on the Finder desktop.

After only a few days with a 16-inch display, you'll wonder how you ever managed to work on a screen that was, well, shorter than your head.

Hidden Costs

While using a 16-inch monitor has its pleasures, getting it running can be a pain.

Not all Macs support 16-inch mode First, 16-inch video technology is too new to be fully compatible with yesterday's Macs. Plugged into the factory-equipped video port of an LC, LC II, IIsi, IIci, IIvx, or any Performa but the 450, a 16-inch monitor runs in the 14-inch mode—640 by 480 pixels. As a result, you see bigger dots—not better resolution—hardly worth shelling out the extra bucks.

If you want to boost the screen display to its proper 832-by-624-pixel splendor, you need to purchase an additional video board, such as Apple's Macintosh Display Card 8•24 GC or SuperMac's Spectrum/24, which can cost $500 to $1000.

Color depth may be limited Second, higher resolution can mean fewer colors. For example, an LC III upgraded to 768K of VRAM can display 32,768 colors (16-bit color) on a 14-inch screen, but only 256 colors (8-bit color) on a 16-inch screen. Similarly, if your system uses Apple's 8•24 GC video board, get ready to say good-bye to the abundance of 16.7 million colors (24-bit color) and hello to a parsimonious 256 colors.

To regain the larger color range, you need to purchase a new video board or upgrade your current one. High-resolution 24-bit video boards start at $1000 (see "24-Bit Color Graphics," *Macworld*, February 1993).

If your work depends on 24-bit color, the total $2000 price may set you to wondering whether a 19- or 21-inch monitor is a better solution. Well, only if you're made of money. A 19-inch monitor with 24-bit color is likely to run you in the neighborhood of $3500 to $4000. Add in another $1000 for 21-inch display.

Understanding Screen Size

Despite their names, 16-inch and 17-inch monitors are the same. And one monitor might actually show a smaller (more compressed) image than another, since vendors can set different active areas for the actual screen image. Although these differences aren't new, many users remain confused about what they actually get when trying to sort companies' claims.

16 inches versus 17 inches Monitor screens—like televisions—are measured diagonally from corner to opposite corner, a measurement called the screen diameter. But what you may not know is that all so-called 16- and 17-inch monitors are either identical in size or very close to it. For example, based on their names, you might expect Mitsubishi's Diamond Pro 17 to be larger than Apple's Macintosh 16-Inch Color Display. In fact, they both offer an identical Trinitron picture tube manufactured by Sony. The difference is that while Mitsubishi and most other vendors measure the picture tube diagonally from corner to opposite corner, Apple measures only the viewable area's diagonal (the portion that can display an image) of the tube (about 16.05 inches). Of course, not every vendor buys tubes from Sony. Some vendors, including NEC and Philips, develop their own varieties of picture-tube technology. But these, too, have similar diameters.

Do 15-inch monitors fit in? Macworld Lab also looked at a few 15-inch monitors, including the FastRefresh/15 from Philips, the Precision Color Pivot from Radius, and the ColorMax 15 from Sigma Designs. Unlike the same-size 16-

MW LAB Measuring Midsize Monitor Quality

OBSERVED QUALITY

Screen Focus — We examined text at several places on screen and in several fonts to detect how sharp a monitor's focus is. Sharper focus improves readability.

Color Saturation — We examined a detailed color image at 16-bit color depth to gauge how well a monitor displays colors. More saturation ensures a truer display.

Color Balance — We examined the display for color shifts and color-display irregularities across the spectrum. Uniform color balance ensures a truer display.

Best result for each test.
Products are listed in alphabetical order.

	Screen Focus	Color Saturation	Color Balance
Apple Macintosh 16-Inch	fuzzy	vivid	uniform
Ikegami C/T-17A	sharp	vivid	uniform
Mirror ProView 16-Inch	acceptable	vivid	uniform
Mitsubishi Diamond Pro 17	acceptable	acceptable	uniform
Nanao FlexScan F550i W	sharp	acceptable	shallow reds
NEC MultiSync 5FG	acceptable	acceptable	uniform
NEC MultiSync 5FGe	acceptable	acceptable	shallow reds, cyans
Panasonic PanaSync/Pro	sharp	vivid	uniform
Philips FastRefresh/17	very fuzzy	lackluster	dingy yellow cast
RasterOps Sweet 16	fuzzy	acceptable	sea green cast
Samsung SyncMaster 5C	acceptable	vivid	weak midtones
Seiko CM1760LR	acceptable	vivid	shallow blacks
Sigma Designs ErgoView 17	acceptable	vivid	uniform
Sony CPD-1730	acceptable	vivid	uniform
SuperMac E-Machines T16 II	acceptable	lackluster	shallow reds, blacks
SuperMac SuperMatch 17 T	acceptable	vivid	uniform
ViewSonic 17	acceptable	acceptable	weak midtones

and 17-inch monitors, these 15-inch monitors are truly smaller: a full 2 inches less from corner to opposite corner.

After much deliberation and testing, we decided the 15-inch monitors were too small to display 832 by 624 pixels at resolutions to which most users are accustomed. In some cases, the density of the pixels surpassed 80 dpi, a dramatic visual departure from Apple's 72-dpi norm. Then again, if you're used to cutting diamonds or scrutinizing microscopic organisms, you very well might disagree—and more power to you, because 15-inch monitors are significantly less expensive, ranging from $600 to $800. (The Radius costs more like $1000, but then you're paying for the pivoting feature.)

Active screen dimension More important than the size of the picture tube is the active screen dimension, which is the portion of the screen that contains the image. Fresh out of their boxes, the 17 monitors evaluated by Macworld Lab have active screen dimensions ranging from a scant 13.9 inches diagonally (Sigma Designs' ErgoView 17) to a generous 15.6 inches (Seiko's CM1760LR).

This represents a difference in vendor philosophy. The perimeter of the screen is where you're most likely to see color shadows and screen distortions. Some vendors hope to protect you from these pesky abnormalities by presetting the active screen area to not reach the perimeter; others figure you'll be concentrating most of your efforts nearer the center of the screen, so you might as well enlarge the pixels as much as possible.

But either way, you can override the vendor's philosophy according to your tastes. Using the horizontal and vertical size controls, you can enlarge or reduce the active screen area, both proportionally and nonproportionally, to suit your particular needs or whims. NEC promotes the maximum active area by providing the FullScan feature, which lets you enlarge the image so it fills up the entire screen; the NEC's relatively flat picture tube helps minimize distortion.

So common are the resize controls that only one monitor—the RasterOps Sweet 16 Color Display—lacks them entirely. Apple hides its size controls behind a door on the left side of the monitor. As if that weren't enough to dissuade the rampaging size adjuster, the controls are recessed so that you can only access them using a small screwdriver.

Monitors for All Computers

Except for a few monitors from traditional Macintosh vendors like Apple and SuperMac, the days of the Mac-only display are happily drawing to a close. Of the 17 monitors reviewed, 13 are multisync devices, capable of accepting and interpreting a variety of signals from Macs, DOS PCs, and other systems. This trend is a boon not only to systems managers hoping to purchase a squad of screens for an integrated Mac and PC environment, but also to small-business users who need to use both Macs and PCs if for no other reason than to retain compatibility with their clients' computers.

We looked only at monitors that are ready to plug in and use with a Macintosh system. A few are little more than Super VGA monitors that have been available to PC users for years. The only difference is that the monitors we looked at come with special 16-inch Macintosh (DB-15) adapters that instruct the Mac's video hardware to send out an 832-by-624-pixel video signal to the monitor.

Adapters not included Some vendors—Sony among them—require that you pay extra for the adapter ($19.95 for Sony's); most provide the adapter for free. ViewSonic lets its dealers decide whether Mac adapters are included; if not, you can buy one from ViewSonic for $25. Make sure to ask before purchasing the monitor so you're not scrambling for an adapter at the last minute.

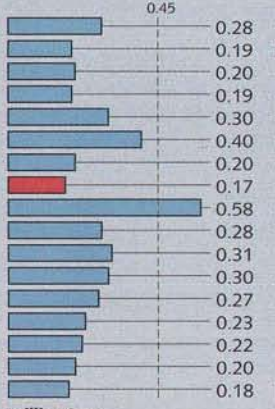
How to use any Super VGA monitor However, the 17 monitors in this article aren't the only 16-inch monitors you can use with your Mac. Of the nearly countless brands of 16-inch multisync Super

MEASURED QUALITY

Convergence

Convergence denotes how closely a monitor's red, green, and blue electron beams hit the same pixel on screen. The better the convergence, the sharper the image and the truer the colors. A measurement of 0.45 or less is good.

Shorter bars are better.

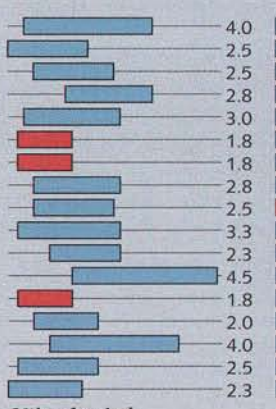


millimeters

Distortion

The greater the difference between the screen's minimum distortion (bar's left side) and its maximum distortion (bar's right side), the more noticeable the distortion will be. A difference of 8.0 or less is good.

Shorter bars are better.

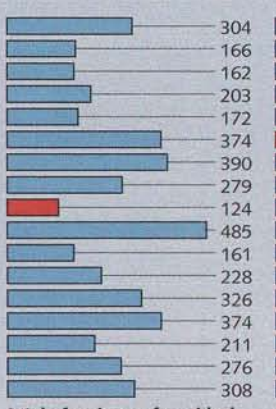


64ths of an inch

Gray Linearity

Gray linearity shows how accurately a monitor displays shades of hues across the spectrum from 100 percent to 0 percent. A perfect linearity measurement is 0. The worst possible linearity is 2700.

Shorter bars are better.

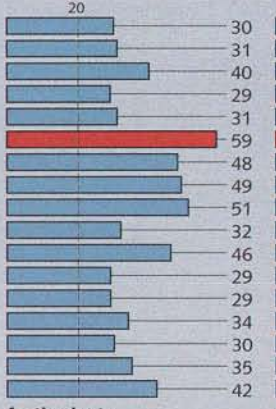


total of variances from ideal values in 12 tests

Brightness

Most people prefer a brighter monitor. We turned up the screen's brightness as high as it could go without showing scan lines. A monitor that puts out less than 20 footlamberts is considered dim.

Longer bars are better.

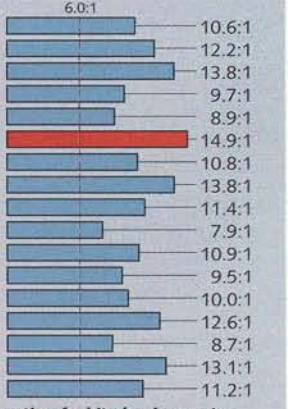


footlamberts

Contrast

The better the contrast ratio, the better you can see details in both light and dark areas of an image. We calculated the ratio between the luminance of white and black squares throughout the screen. A ratio of 6.0:1 or more is good.

Longer bars are better.



ratio of white luminance to solid black

Comparing Midsize Monitor Features

	Product	List Price	Monitor Type	Weight (in pounds)	Comments	Phone
Apple Computer	Macintosh 16-Inch Color Display	$1459	Trinitron	50	Monitor stand has pass-through ADB and sound ports. Size and pitch controls are hidden behind door and require screwdriver to access.	408/996-1010
Ikegami Electronics USA	C/T-17A	$2795	multisync Trinitron	58	Can change RGB settings and access other controls via central control panel. Offers distortion and convergence controls and input switch.	201/368-9171
Mirror Technologies	ProView 16-Inch Display	$1099[A]	multisync Trinitron	54	Stand springs back whenever you lift or move monitor.	612/633-4450
Mitsubishi Electronics America	Diamond Pro 17	$1499	multisync Trinitron	48	Brightness and contrast buttons flash when limit for setting is reached. Offers convergence control.	714/220-2500
Nanao USA	FlexScan F550i W	$1599	multisync tridot	49	MD-C63 cable lets you switch resolutions between sessions; controls provide good feedback. Offers distortion and RGB controls and input switch.	310/325-5202
NEC Technologies	MultiSync 5FG	$1355[B]	multisync tridot	56	DPI-OnTheFly software lets you switch resolutions without restarting; monitor can store two sets of RGB preferences and restore defaults. Offers distortion and RGB controls and input switch.	708/860-9500
	MultiSync 5FGe	$1155[B]	multisync tridot	54	Less capable but low-ELF-emission version of 5FG.	708/860-9500
Panasonic Communications & Systems	PanaSync/Pro C1795E	$1579	multisync tridot	33	Can store two sets of RGB preferences and restore defaults. Offers distortion and RGB controls and input switch.	201/392-4932
Philips Consumer Electronics	FastRefresh/17	$1249	multisync tridot	54	Controls are accessed from bewildering LCD menu. Offers distortion control and input switch.	615/521-4316
RasterOps	Sweet 16 Color Display	$1499	tridot	35	Obvious moirés in tridot pattern; dark even at highest brightness and highest contrast; degauss button unintuitively presented as knob. Lacks size and centering controls.	408/562-4200
Samsung	SyncMaster 5C	$1399	multisync tridot	48	Input switch is smart enough to switch back if it can't find signal; control door sticks; monitor's black casing matches the PowerBooks' color. Offers distortion control and input switch.	404/434-5400
Seiko Instruments USA	CM1760LR	$1499	Trinitron	51	RGB guns misconverged in center-top portion of screen.	408/922-5800
Sigma Designs	ErgoView 17	$1349	multisync Trinitron	51	Provides LCD readout behind control door (remains lit when door is closed); control door sticks; has palm-size power button. Offers distortion control and input switch.	510/770-0100
Sony Corporation of America	CPD-1730	$1760	multisync Trinitron	44	Controls flash when limit for setting is reached. Offers distortion control.	408/432-1600
SuperMac Technology	E-Machines Color-Page T16 II	$1699	multisync Trinitron	51	Couldn't achieve pure black, even at lowest brightness and highest contrast. Offers distortion control and input switch.	408/773-4498
	SuperMatch 17 T	$1249	Trinitron	57	Includes three adapters for switching resolutions between sessions.	408/773-4498
ViewSonic	ViewSonic 17	$1299	multisync tridot	43	Obvious moirés in tridot pattern; serrated vertical lines; cramped control panel. Offers distortion control and input switch.	909/869-7976

Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's ing bonuses and demerits, to derive the final rating. Ratings are for companies, not individual products, and we call only those companies whose products Macworld Lab tests. [A] *Sold directly* [B] *Company's estimated dealer price (it has no list price).*

Toll-Free Phone	Technical-Support Rating
none	support not offered
none	poor
800/654-5294	acceptable
800/733-8439	excellent
none	poor
800/632-4636	good
800/632-4636	good
800/742-8086	support not offered
800/722-6224	unacceptable
800/729-2050	unacceptable
none	unacceptable
800/888-0817	good
800/845-8086	poor
800/222-7669	good
800/334-3005	acceptable
800/334-3005	acceptable
none	poor

support technicians. Macworld uses a point system, includ-through Mirror only; compare price with your dealer's prices.

VGA monitors available for the PC, all can be adapted to the Mac if only you can find an adapter. James Engineering (510/525-7350) now sells an 832-by-624-pixel adapter called the MacComp 16 ($25), which means bargain hunters can hunt down a super deal from a low-margin dealer, purchase an adapter, and bask in the glow of hundreds of dollars saved.

Best PowerBook Super VGA display Incidentally, if you've considered buying a color PC monitor for your Super VGA–compatible PowerBook 160, 165c, 180, or 180c, make sure to also buy an adapter. When attached to a Super VGA monitor with Apple's PowerBook–to–Super VGA adapter, the PowerBooks generate a Super VGA signal with a low refresh rate (56Hz, compared with the top-of-the-line 72Hz rate), which results in obvious screen flickering. You're better off using Apple's PowerBook-to-Mac video adapter and purchasing a Mac–to–Super VGA adapter to attach to it. While daisy-chaining two adapters is not elegant, it will make the PowerBook generate a standard Macintosh display signal with a higher refresh speed (67Hz).

Resolution switching You can also use adapters to switch resolutions, depending on the video capabilities of your Mac. For example, a Centris 650—the machine we used in our testing—can deliver video signals as high as 1152 by 870 pixels, the equivalent resolution of a 21-inch monitor. (A 14-inch monitor typically runs at 640 by 480 resolution, a 16-inch monitor at 832 by 624, a 19-inch at 1024 by 768, and a 21-inch at 1152 by 870.) Resolution switching lets you magnify a portion of the screen inside applications—like the Finder—that don't support zooming. You can also zoom out to see several applications open at once. The screen images in "One Monitor, Many Resolutions" show the effect.

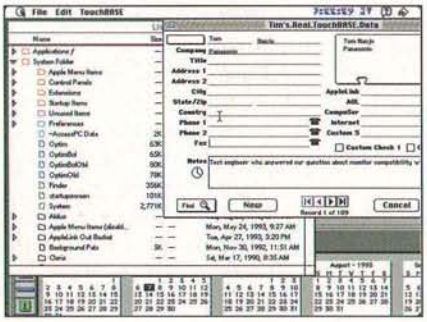
For $74, you can purchase a special cable (MD-C63 or MD-C68) with the Nanao FlexScan that lets you change between any of four resolutions simply by moving a switch. And although it's not a multisync device, SuperMac's SuperMatch 17 T includes adapters for 640-by-480, 832-by-624, and 1024-by-768-pixel resolutions. (The SuperMatch supports several specific frequencies; a true multisync monitor can lock onto any frequency within its range.)

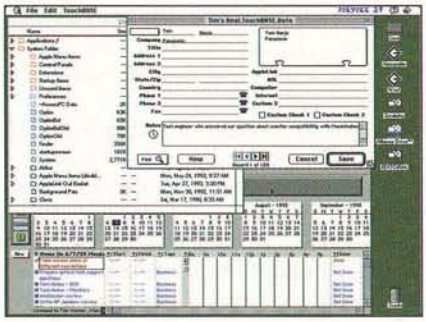
In each case, you must restart your Mac before the new resolution can take effect (just as in Windows, except that you don't need special adapters in Windows). If you want to change resolutions while the computer is running, you usually have to purchase a vendor's video-display board along with the monitor. The one exception is NEC, whose MultiSync 5FG includes a program called DPI-OnThe-Fly that lets you switch between three resolutions—640 by 480, 832 by 624, and 1152 by 870—when using the on-board video capabilities of the Quadra 700, 900, and 950. By the time you read this, version 2.5 will be available, which adds support for the Centris 610 and 650, Quadra 800, and LC III, along with another resolution: 1024 by 768. But DPI-OnThe-Fly won't work with other vendors' mon-

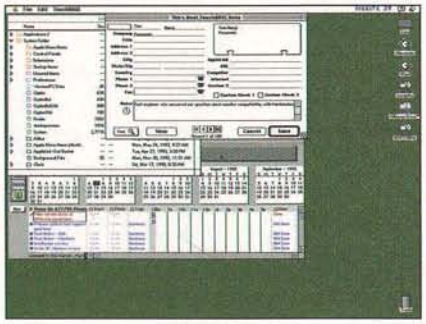
BEHIND OUR TESTS

MW LAB Macworld Lab tested midsize monitors using two criteria: measured quality and perceived quality. The figures in "Measuring Midsize Monitor Quality" include quantitative results for the most important aspects of monitor performance. Brightness and contrast were measured with a Minolta luminance meter on a standard black-and-white target screen. We determined linearity by measuring the contributions of the red, green, and blue electron guns as we decreased the brightness of an all-white desktop in 10 percent increments. To measure distortion, we displayed a black-and-white target that put 1-inch squares in the center, in the corners, and along the edges of the display; we measured the squares with an antiparallax ruler, then compared the outer squares to the size of the center square. Convergence (more aptly called misconvergence) was measured using a Klein convergence meter, again at the center and in each corner.

To ascertain perceived quality, the lab staff, author, and editor examined three color images on each monitor. The images were displayed in 16-bit color using the Centris 650's built-in video (with 1MB of VRAM). Displays were judged on their focus, color saturation, and color range, along with the innumerable individual criteria picky people use to judge before they buy. We also scrutinized displays for text quality, sharpness, focus, and ghosting. "Measuring Midsize Monitor Quality" encapsulates our opinions.—**Macworld Lab testing supervised by Tim Warner**







One Monitor, Many Resolutions Switching resolution is a new feature for Mac owners, but its benefits are significant for people who need to see more desktop—or larger text—than their monitor's standard resolution permits. From left to right is the same desktop in 14-inch, 16-inch (WYSIWYG), and 19-inch resolutions as displayed on the same 16-inch monitor.

itors. Still, the $20 Monitor Switch utility (shareware, David Suggs) works with most multisync monitors and all Centrises with 1MB of VRAM and all Quadras with 2MB of VRAM.

Dual-source monitors Nine of the monitors go so far as to let you plug into two sources at the same time and switch back and forth between the two. You can hook up two Macs or a Mac and a PC to the same monitor. Video editors can plug one cable into the standard Mac video port and the other into a video-output board like Truevision's NuVista+. One moment you see an editable Macintosh graphic. Switch, and then you see the graphic overlaid onto live video.

The monitors are the ColorPage T16 II from E-Machines (whose product line SuperMac now sells), Ikegami's C/T-17A, Nanao's FlexScan F550i W, NEC's MultiSync 5FG, Panasonic's PanaSync/Pro C1795E, Philips' FastRefresh/17, Samsung's SyncMaster 5C, Sigma Designs' ErgoView 17, and the ViewSonic 17.

Our Favorite Monitors

Which monitor should you buy? While the majority of the monitors varied only slightly in quality, Ikegami's C/T-17A and Panasonic's PanaSync/Pro C1795E sailed through our subjective ratings, achieving top marks in every category (see the results in "Measuring Midsize Monitor Quality"). Both machines provide great focus, vivid color saturation, uniform color range, and all the controls you could ever want.

Unfortunately, an Ikegami monitor will run you more than $2000 on the street, nearly twice the price of its competitors. For that much money, you can purchase a 21-inch monitor.

Meanwhile, Panasonic offers no technical support, instead referring bewildered customers to regional computer stores and service centers. We were referred to a retailer that didn't even carry the C1795E. And a service-center representative suggested that one of our technical-support testers bring in the entire computer to be serviced when the real problem was a missing $20 adapter. If you're technically savvy enough to solve your own problems, the PanaSync/Pro is a great monitor. Otherwise, read on.

Ranking second were a handful of Trinitron monitors including Sony's CPD-1730, SuperMac's SuperMatch 17 T, Mirror's ProView 16-Inch Display, and Sigma Designs' ErgoView 17. The focus was a little soft with all of these screens, but that we can forgive. The Sony and the Sigma Designs monitors have the additional edge of offering better controls and multisync capabilities. We chose the Sigma Designs display as our Editors' Choice because it lets you switch between two input sources—ideal for the cross-platform user.

Still, we wouldn't let any of this interfere with a purchasing decision. If someone offers you a good price on any one of these monitors—for example, we saw the SuperMatch 17 T advertised for $1009—buy it. (One caveat: If you're thinking about buying the Mirror monitor, be sure to try out the stand first. Its spring action bothered one of our testers, since it can bounce out of your desired setting when you move the monitor.)

If controls are important to you, try out Nanao's FlexScan F550i W or NEC's MultiSync 5FG. Each had its own deficiencies in the subjective tests—both, for example, exhibited flat color saturation—but these monitors provide a wider variety of distortion and color controls than any competitors but the Ikegami and Panasonic. If we had to choose between the Nanao and the NEC, we'd go with the NEC, thanks to its uniform color range and DPI-OnTheFly software.

But you really can't go wrong with most of the monitors we tested. In fact, when the testing was over, we all agreed that we'd be satisfied with any 16- or 17-inch monitor except the Philips FastRefresh/17 and the RasterOps Sweet 16 Color Display. The FastRefresh/17 featured the fuzziest, least colorful screen of the bunch. One tester labeled the display's obvious yellow cast "screen plaque." The Sweet 16 offered a slightly better picture—this time the cast was green instead of yellow—but it lacked any controls beyond brightness and contrast. (RasterOps also scored low on our technical-support evaluation, although it has done better in the past.)

Otherwise, midsize monitors measure up nicely. If you're in the market for a new Mac and you're considering an LC III, a Centris, or a Quadra, seriously consider adding a 16-inch monitor to your shopping list. The technology is ready, the products are capable, and it's all priced to sell. The little screen is dead. ■

Thanks to his recent book (*Macworld Photoshop 2.5 Bible*, IDG Books Worldwide, 1993), contributing editor DEKE McCLELLAND is intimately familiar with every pixel on his monitor.

MIDSIZE COLOR MONITORS

MW EDITORS' CHOICE

In addition to our quality evaluation, we used price, tech support, and overall design (such as control types and placement) to determine our top picks.

ErgoView 17 Except for slightly soft screen-focus, this monitor did well in all our tests, providing excellent saturation and color range. High-end users can cable the monitor to two video sources and switch between the two at will. **Company:** Sigma Designs. **List price:** $1349.

MultiSync 5FG Not to be confused with the 5FGe—which offers fewer color and resolution options—the 5FG is the control king, letting you edit on-screen colors and switch resolutions on the fly. **Company:** NEC Technologies. **List price:** None (NEC's estimated dealer price is $1355).

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High-Speed FAX MODEMS

MACWORLD LAB TESTS 30 MODELS THAT RUN AT 9600 BPS OR FASTER

by Matthew Clark

Looking to buy a fax modem? You're in good company. By 1996, the worldwide installed base of fax modems and fax LAN servers will jump to a whopping 25.3 million—that's up from 3.9 million in 1992—according to a recent survey done by BIS Strategic Decisions for the International Computer Facsimile Association. And fax modems already outsell traditional stand-alone fax machines, the survey found.

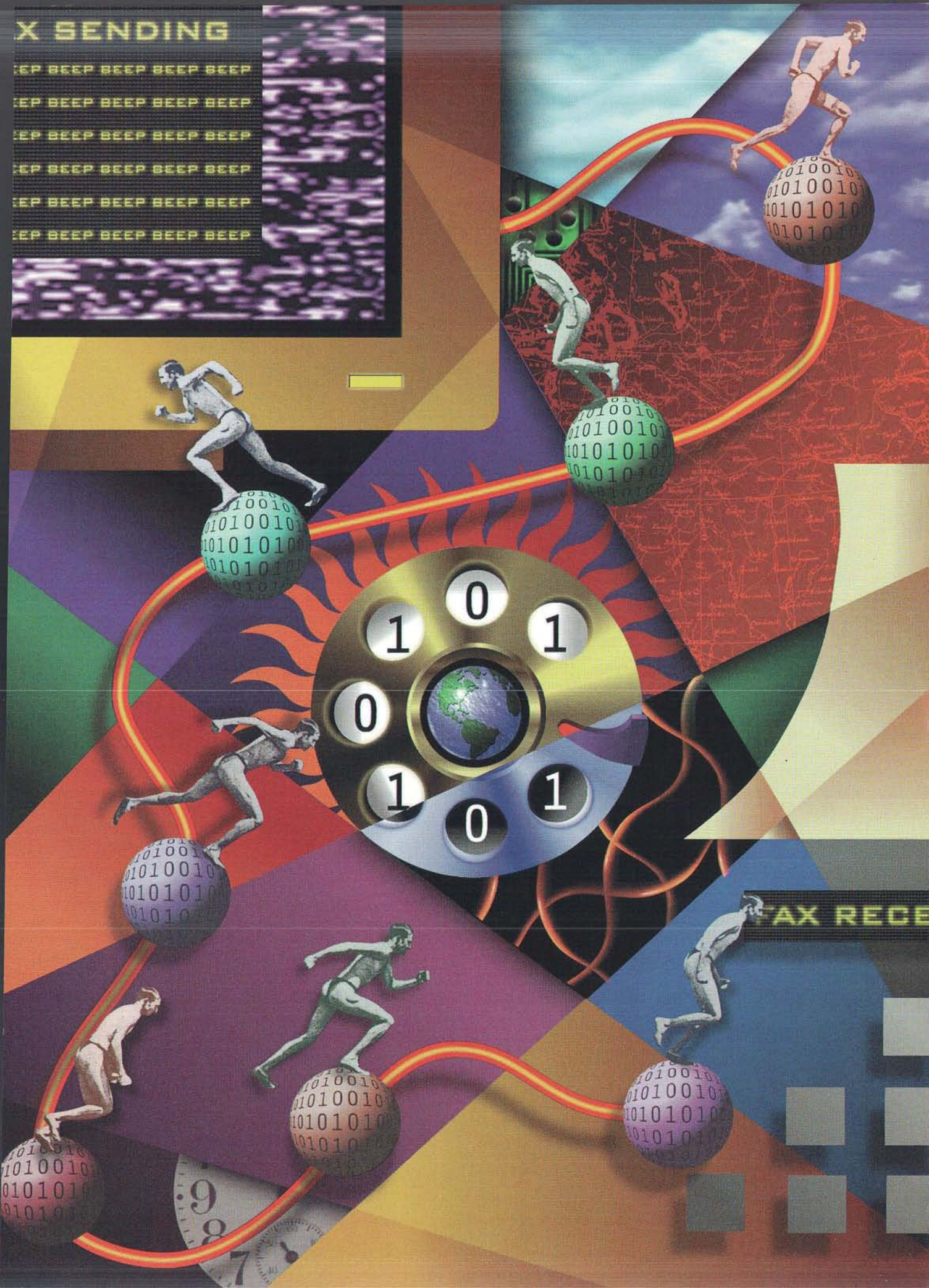
Fax modems are clearly becoming a standard business tool, and new technologies are resulting in faster modems that take advantage of error correction and compression to boost reliability and speed. Macworld Lab tested 30 fax modems that run at 9600 bits per second (bps) or faster for both their fax and modem components. Many less-expensive fax modems are available that run at 2400 bps, but you need 9600-bps speed when dialing into your office Mac from home or when on the road, because of the volume of data in the Mac's graphics.

Although there are many fax modems to choose from, Macworld Lab testing revealed that there are very few performance differences in the hardware—fax modems are basically alike. What does differ is the software that controls the modems, and you should base your initial purchase decision on the software and price.

Deciding What You Need

Fax modems come in both internal and external versions; some are dedicated to just one user, while others can support multiple users over a network. Some vendors also offer options or software upgrades that add voice recording and optical character recognition (OCR).

Choosing a fax modem to fit your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AX RECE

work environment is a relatively easy thing to do: you figure out how much you want to spend, what features you'll need, and whether you need to have it on a network or as a stand-alone unit. But choosing a fax modem that fits into the *world's* work environment is not as simple. There are several standards and transmission speeds, and you need to consider the capabilities of the faxes and modems you will be communicating with. The sidebar "Bis, Dot, and the Other Thing" helps you understand this bigger picture.

Fax Modems for All Tastes To differentiate and add a little flair to functionally similar products, companies make fax modems in all shapes and sizes. Six examples are (top photo, from left) the Twincom Voyager, Computer Peripherals Viva 14.4/Fax, Practical Peripherals PM14000FX PKT, and (bottom photo, from left) U.S. Robotics Mac Fax Sportster, Telebit T3000, and Global Village Teleport Gold.

Inside the Fax Modem

A fax modem is essentially a fax machine crammed inside a modem. The key difference is that there is no scanner or printer; you are limited to faxing documents you created on your computer (or scanned in), and you must use your printer if you want a hard copy.

The key component that enables a fax modem to do its work is a chip set (basically, a CPU). Several vendors offer these chip sets (the chip sets in the units we tested came from AT&T, Phylon, Rockwell International, and Texas Instruments), but Macworld Lab testing showed no hardware performance differences, so it doesn't really matter whose chip set is in your fax modem.

But you still need to pay attention to the chip set *version*, because there may be differences in the ROMs. These differences are due to bug-fixes that the chip-set makers expect the fax modem vendors to implement. That means that two fax modems with the same chip set but different ROM versions may work differently. All the vendors surveyed for this feature said they implement these bug-fixes, but if you have problems with your fax modem, be sure to ask whether you have the most recent ROM—if not, the vendor should send you a new one. Most vendors said that they provide the revised ROM at no charge, if you install it yourself. You can also send in your fax modem and have the vendor do the work for you at a nominal fee.

The combination of an older chip set and default software settings can prevent a fax modem from sending a file over noisy telephone lines. In Macworld Lab tests, all Practical Peripherals fax modems, both Hayes modems, the Twincom Voyager 14400 Pocket Data + Fax Modem, the Bay Connection Spectra-Com

PHOTOGRAPHS BY LUIS DELGADO

P14.4, and the Archtek America Corporation SmartLink M9614 AVQ failed to handle extremely noisy lines (see the sidebar "Behind Our Tests").

How Fax Modems Communicate

Just what is all that screeching going on when you connect to another fax? Those screeches are actually sonic beacons that go out from the sending unit to the receiving unit and back again to determine a number of factors, including line conditions and protocol-transmission capabilities.

There are five phases in the fax modem connection ritual.

Phase 1: Wake up, I'm ready. The sending machine dials the phone number of the receiving machine, which picks up and listens for a signal identifying the transmission as data or fax. For a fax transmission, a CNG (Calling) tone is sent out to the recipient. (At this stage, your fax modem is acting just like a standalone fax machine.) The receiving machine responds by charging up the fax portion of its circuitry and (after about a second) transmitting a CSI (Called Station Identification) tone indicating to the sending fax machine that it is ready for the next phase.

Phase 2: How fast can you talk? The receiving fax machine then sends a DIS (Digital Identification Signal) tone, which tells the sending fax at what speed the receiving fax can accept data. This signal is transmitted at 300 bps to ensure reception. If the sending fax agrees with this speed, the receiving fax sends an additional signal to lock in the connection. The sending fax then sends a high-speed signal that is confirmed by the receiving fax. The modems then synchronize their speeds for data exchange.

Phase 3: Deliver the message. This phase begins with a signal that again locks in the transmission speed. This is followed by transmission of the "picture" signals (a page of your digitized document).

Phase 4: Are you done yet? After it transmits your page, the sending fax sends an RTC (Return to Control) command that tells the receiving machine to go back

TOOLS FOR HOME-OFFICE FAXING

If you use a fax modem as part of your home office, you probably know just how tricky it can be to get your phone, answering machine, and fax modem working together smoothly. Throw in another wrench for your printer and you've got quite a mess. If you're considering adding a fax modem to your home-office setup, watch out for three main trouble spots: too few phone lines, too few serial ports, and accessibility.

Phone-line bottlenecks Do you have a fax modem, answering machine, and phone (with call waiting, even) for your business, plus the family phone in the kitchen all sharing one line? Then you need something to control the traffic over your precious, lonely link to the outside world. You need something that tells which peripheral to pick up when.

For example, Command Communications (303/750-6434) offers the $129.95 ASAP TF 300plus, which identifies incoming calls and routes them, as appropriate, to a fax, phone, answering machine, or modem. In using it, we did have occasional problems with incoming voice calls being routed to the modem or not being transferred to the answering machine.

Strongly consider adding another phone line if you have only one line for personal and business use. Most home-office workers consider a dedicated office line a necessity. Call your local phone company for information on installing additional telephone lines.

Serial-port bottlenecks Macs come with only two serial ports. That's where you connect your printer and modem to your computer, and where you sometimes connect other devices, like digitizing tablets. The high-tech workaround for out-of-portitis is to buy an expander.

One choice is the $159 Axion 3 Serial Port Switch (Axion, 408/522-1900). It turns one serial port into three. Software lets users switch between devices; under System 7, users can switch between ports on the fly. Axion's switch works on all Macs made after the Plus and requires System 6.0.7 or later.

Another choice is the QuadraLink (Applied Engineering, 214/241-6060), which costs $219 and adds four serial ports to NuBus Macs. The ShadowLan QuadraLink ($293) software networks your ports so others can use them as well.

The low-tech way is cheaper: position the Mac on your desk so there's about a foot of space behind it. When you want to use another device on the serial port, reach behind your Mac, unplug one device (your choice), and plug the new device in its place.

Accessibility So what do you do when you have your phone lines and serial ports under control, but haven't got your fax scheduling to agree with your local time? How do you get that fax at 3 a.m. from Abu Dhabi without leaving your Mac on 24 hours a day?

One option is the $119 PowerKey (Sophisticated Circuits, 206/485-7979), into which you plug a Mac and up to three peripherals so you can turn them all off by flicking just one switch. If you handle faxes at regularly scheduled hours, use the PowerKey to turn on your Mac and fax modem), run a QuicKeys macro (QuicKeys Lite is included) to download faxes from an online service or send faxes, then shut down after a set period of time. This saves electricity costs. If faxes come in irregularly or in the middle of the night, add the $49 PowerKey Remote so your Mac will wake up when a phone call comes in (see *Reviews, Macworld,* December 1992).

Another option is the AT&T Fax Mailbox (AT&T, 800/446-2452). Faxes are sent to a Fax Mailbox phone number and stored (as many as 25 faxes for up to 8 days). You call a toll-free number, use your calling-card number to access your mailbox (for security), listen to voice-mail messages, and either delete faxes or retrieve them to a number you enter; delivery takes about 10 minutes. AT&T charges 70 cents per page.

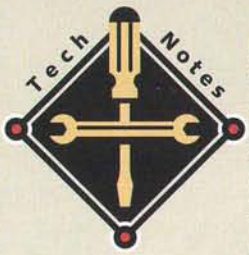
Odds 'n' ends While they do not address the three main problems, the following products are useful, and they're inexpensive.

The $24 OfficePro Fax/Transmittal (Stormworks, 919/834-9420) creates fax Post-it–style notes, cover sheets, and letters-of-transmittal forms. It has a built-in phone directory and creates fax logs. It requires a Mac Plus or better and Microsoft Excel 2.2 or later.

The $14.95 Fone (shareware, Eugene L. Woods) tracks pricing for residential, business, and international calls—in real time. It also calculates volume discounts and includes a personal phone directory.

The $79 Line Share 1.6 (Stalker Software, 408/866-4722) lets communication lines (serial ports with attached modems) be shared among several communication services (for example, between fax software and AppleTalk Remote Access software). It requires System 7.—**Suzanne Courteau**

BIS, DOT, AND THE OTHER THING



If you're in the market for a fax modem, be prepared to dive into an alphabet soup of terms and classifications.

Fax modem standards are set by the Comité Consultatif International Télégraphique et Téléphonique (the International Telegraph and Telephone Consultative Committee).

CCITT standards are characterized by a letter denoting the series (such as faxing or telephone cabling) and a number denoting the particular standard. While the standards have similar names, their letter-and-number combinations do not indicate speed or type. For example, V.42 applies to error correction, while V.42bis applies to data compression (*bis* comes from the French word for *second* in a series). Despite a name (V.42bis) that implies it is an extension to an existing standard (V.42), V.42bis is in fact unrelated—typical of CCITT's naming conventions.

Protocols There are different protocols (the script devices use to exchange information) for modeming and faxing. For modems there are V.32, which applies to 9600 bps, and V.32bis, which applies to 14,400 bps. These protocol standards assure that modems can connect with other modems supporting that standard; they also mean different-speed modems can negotiate a speed at which to communicate.

The V.17 standard applies to 14,400-bps fax modems and assures that they will communicate at the fastest possible speed; V.29 applies to 9600 bps; and V.27ter applies to 4800 and 2400 bps (*ter* comes from the French word for *third*).

Classes The fax part of fax modems is also categorized as belonging to a class, according to how the hardware and software interact. These classes are defined by the Electronic Industries Association (EIA). Under the Class 1 standard, most of the work is done by the fax modem's software. Because Class 1 modems rely on software to implement protocols, upgrading protocols is less complicated. At the same time, Class 1 requires vendors to build the management of the fax connection into the software—which can be more complicated than doing so in hardware.

With Class 2, most protocol work is done by the modem's hardware, while the computer manages the session. This partially relieves the burden on software developers and makes the modem—not the computer—responsible for many aspects of fax communications.

The EIA took a long time to approve the Class 2 standard, and in the interim, many vendors developed products adhering to a draft version of the Class 2 standard. This translates to less consistency in different products' implementation of Class 2.

Groups Most modern fax machines in the United States comply with the CCITT's Group III standard. Groups I and II, which are now mostly obsolete, produce much slower transmission times and poorer resolution than Group III fax machines. All the fax modems we tested are compatible with Group III fax machines.

Correction and compression The CCITT standard for error correction is V.42, which now includes other standards set forth in MNP (Microcom Networking Protocol) Classes 2 through 4. MNP was developed as a proprietary standard by Microcom, but the standard has become common industry-wide, just as Hayes's proprietary standards for modem commands have become de facto standards.

Another important standard for modems is data compression. By compressing data, modems can send files more quickly, in effect increasing their throughput speed. The two standards for data compression are the CCITT's V.42bis and MNP Class 5. Modems using the V.42bis standard tend to compress more thoroughly than those using MNP Class 5, and V.42bis recognizes precompressed files and doesn't waste time trying to recompress them, while MNP Class 5 doesn't identify those files. A modem adhering to both standards will assure that communication with other modems will remain consistent, although the two protocols cannot be used simultaneously.

Having a fax modem that doesn't comply with industry standards may bring you connection difficulties, error-ridden faxes, and sleepless nights. Why take the chance?—**Joanna Pearlstein**

to 300 bps. The sending fax then sends a signal that says it's done. The receiving fax machine then transmits confirmation that the page was received successfully or a request to try again. If additional pages need to be sent, the third and fourth phases repeat for each page until all pages have been successfully transmitted.

Phase 5: Ciao! When the last page has been confirmed, the sending fax sends a disconnect signal to the receiving unit and both machines hang up.

Do You Need 14,400-bps Speed?

Of primary concern to most users is the speed at which the fax modem can connect with similar devices. Most online services accept connections as fast as 9600 bps (for Mac owners, America Online is an unfortunate exception). So do fax machines using the international CCITT Group III standard; these machines dominate the market and have become the de facto business standard. So if the world is online at 9600 bps, why would you need anything faster?

It turns out that 14,400-bps—usually designated as 14.4-Kbps—transmission is rapidly becoming popular. Many fax modem and fax machine vendors are beginning to implement the v.17 standard in fax communications, which lets the machines transmit data at 14.4 Kbps. This faster data transfer means a significant savings in your phone bill.

One important issue to take into consideration when looking at 14.4-Kbps fax modems is how often you'll be able to connect at the high speed. If you know that the places you will be faxing to can handle 14.4 Kbps, or if you are purchasing similar fax modems for multiple sites, buying a 14.4-Kbps fax device assures you of the highest transfer rate. Otherwise, you'll be buying more speed than you can use.

Software Is Crucial

For every fax modem there is a fax modem application. This software is responsible for transforming your computer file into fax format, scheduling and logging faxes, and detecting and handling incoming fax calls in the background while you're doing other work on your Mac.

Although we looked at 30 fax modems, there were only 5 fax applications in the group. Two of these, Faxstf and QuickLink II, are "universal" and can be used with virtually any fax modem, provided you have the required setup string from the fax modem vendor and the software vendor has the required driver for that chip set. Most fax modems come with either Faxstf or QuickLink II, with Faxstf being the most popular. Both

are also available as stand-alone products; Telefocus's Faxstf costs $79 (816/886-9800), and Smith Micro Software's QuickLink II costs $69.95 (714/362-5800, ext. 2012). The other three applications are written for specific modems: Global Fax from Global Village Communication, Faxcilitate from PSI Integration, and 4-Sight Solo from Circuit Research Corporation. (As we went to press, Hayes began bundling its own software with its modems. Prometheus Products [503/692-9600] also sells high-speed fax modems using its own software, MacFax; units were not available for testing.) Overall, Faxstf and Global Fax are the best.

Only QuickLink II provides communications options in its fax software—and they're limited—so with all other fax applications you still need a communications program to handle modem connections. (Ironically, the Windows version of Software Ventures' popular MicroPhone Pro communications program has integrated fax software, but not the Mac version, which comes with Faxstf.) We examined the software for four key performance areas: imaging and viewing documents, adding addresses, configuration and notification options, and troubleshooting capabilities.

Imaging and viewing documents Much of your time will be spent imaging and viewing your document. The imaging process takes your document after you issue a print command and converts it into fax format for transfer over telephone lines. We tested each application with two Microsoft Word documents: one a simple ten-page document with text only, the other a two-page newsletter that contained a slew of clip art as well as color PICT files.

For imaging, we measured the time from issuing the print command to when the fax modem actually went off hook (was ready to transmit the fax). The benchmarks "Assessing Fax Modem Performance" show the results.

If you fax 50 pages a day, the difference between the fastest software (Global Fax) and slowest (QuickLink II) is 5.5 minutes in document preparation. (4-Sight Solo actually takes the longest time, but it works in the background.) Keep in mind that the imaging time is also determined by the Mac used (we used a Centris 650). A slower Mac means a longer wait, and imaging is such a CPU-intensive task that all the programs but 4-Sight Solo are designed to use full system resources, so they do not work in the background.

For viewing a received fax on screen, we used a newsletter that had text in several sizes and a gray-scale TIFF image. Viewing times were nearly identical for all five applications, but the quality of what was displayed varied. With the exception of Global Village's, all the displayed faxes looked really bad. Small text (10-point and less) was virtually unreadable; graphics had jagged edges.

Why? Faxes have either 200-by-100-dpi resolution (standard) or 200-by-200-dpi resolution (fine), but a Mac's screen displays images at 68 to 78 dpi, depending on the monitor. The viewing software must convert the finer fax resolution to a coarser screen resolution, and that can

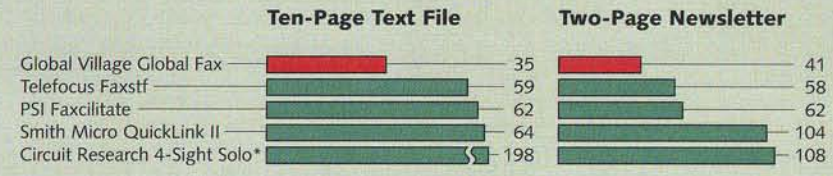
MW LAB Assessing Fax Modem Performance

To test fax modem quality, Macworld Lab evaluated the two major technological components: the software that controls the fax modems and the hardware that handles the actual communication.

HOW FAST IS YOUR FAX SOFTWARE?

Fastest result in each test. Products are in order of overall performance. Times are in seconds.

Fax software determines how quickly your documents are converted into the bitmapped data that one fax actually sends to another. Speed differs greatly among applications. All fax modems tested use one of the following fax applications.



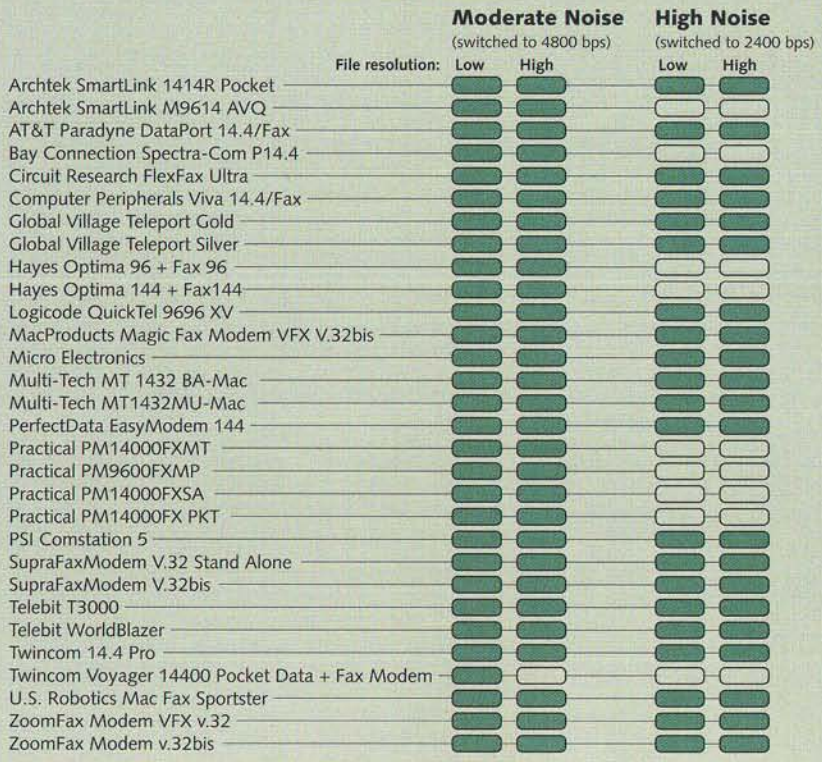
**This imaging software runs in the background. These times include 8.2 seconds (for the text document) and 17.8 seconds (for the newsletter) to transfer the document to the imaging software.*

WHICH FAX MODEMS HANDLE NOISY LINES?

Pass **Fail**

Products are in alphabetical order.

When fax modems encounter noisy telephone lines, they slow down their transmission speed for better error detection and correction. But not all modems can handle much slowdown, as these tests show. Tests were conducted on a PowerBook 160 with 4MB of RAM and an internal 80MB drive.



result in funky display. Global Village's software uses antialiasing to sharpen the edges of text and graphics and to preserve some of the gray shades usually lost in a fax transmission (see the screen images in "Viewing Quality Compared"). For more details on improving fax image quality, see "Power Faxing from Your Mac," in this issue's *At Work* section.

Adding addresses An important feature is the ability to create phone directories containing people's names and fax numbers, something all the applications support. Faxstf, Global Fax, and Faxcilitate had the best methods for creating multiple address books and groups.

Configuration and notification options A major complaint about earlier fax modem applications was that you had to go to several places to perform different tasks. To configure your hardware, you needed to go to the Chooser. For software preferences, you had to open a stand-alone application.

This still holds true for Faxstf, but Faxcilitate (a modified version of Faxstf) and Global Fax each provide an operating environment where you can perform all available functions of the software. Global's Fax Center is an Apple menu item, and Faxcilitate adds a Fax menu to the main menu bar and to any application you have open.

QuickLink II is a stand-alone application that you must launch to change configuration options, but it also doubles as a stripped-down communications program. Unfortunately, it's not a very useful one, and anyone who regularly uses a modem will want a full-feature communications program. 4-Sight Solo also has a stand-alone application, Comm-Server, that provides configuration options as well as an accounting system to log the fax transactions and their phone costs. You can also upgrade to a network version of the software for queuing multiple faxes to one person's Mac.

Troubleshooting All the applications have a log facility that provides detailed information on fax connections and transmissions. This information is valuable if you intend to do a little troubleshooting on your own. (Considering the low technical-support ratings for some vendors, this feature is important.)

The Faxstf log provides the most detailed information of the group, but it sometimes provides only an error ID code to which no corresponding entry exists in the documentation. Also, the log fills up quickly and must be either exported to a text file or cleared altogether.

Global Village's software does a good job of letting you examine your fax transactions by letting you click on a specific transmission and see detailed information about it.

The other three fax programs are adequate.

The Importance of Design

Speed and software are important, but there are additional issues you should consider, such as construction, indicator

What Fax Modems Offer

Company	Product	List Price	Data Compression Protocols	Fastest Data Rate (in bps)	Fastest Fax Rate (in bps)	Fax Software
Archtek America Corporation	SmartLink M9614 AVQ	$458	V.42bis, MNP 5	14,400	9600	QuickLink II
	SmartLink 1414R Pocket	$478	V.42bis, MNP 5	14,400	14,400	QuickLink II
AT&T Paradyne Division	DataPort 14.4/Fax	$350	V.42bis, MNP 5	14,400	9600	QuickLink II
Bay Connection	Spectra-Com P14.4	$299	V.42bis, MNP 5	14,400	14,400	Faxstf, Microphone LT
Circuit Research Corporation	FlexFax Ultra	$999	V.42bis, MNP 5, 10	14,400	14,400	4-Sight Solo
Computer Peripherals	Viva 14.4/Fax	$299	V.42bis, MNP 5	14,400	14,400	Faxstf, Microphone LT
Global Village Commmunication	Teleport Silver	$429	V.42bis	9600	9600	Global Fax
	Teleport Gold	$499	V.42bis, MNP 5	14,400	14,400	Global Fax (with OCR)
Hayes	Optima 96 + Fax 96 for the Mac	$499	V.42, MNP 5	9600	9600	SmartCom Fax
	Optima 144 + Fax 144 for the Mac	$549	V.42, MNP 5	14,400	14,400	SmartCom Fax
Logicode Technology	QuickTel 9696 XV	$409	V.42bis, MNP 5	9600	9600	QuickLink II
	QuickTel m1414 XV	$435	V.42bis	14,400	14,400	QuickLink II
MacProducts USA	Magic Fax Modem VFX V.32bis	$249	V.42bis, MNP 5	14,400	14,400	Faxstf, Microphone LT
Micro Electronic Technologies	9696PF	$399	V.42bis, MNP 5	14,400	14,400	Faxstf, QuickLink II Data
Multi-Tech Systems	MT1432MU-Mac	$699	V.42bis, MNP 5	14,400	9600	QuickLink II
	MT 1432BA-Mac	$829	V.42bis, MNP 5	14,400	9600	QuickLink II
PerfectData Corporation	EasyModem 144	$676	V.42bis, MNP 5	14,400	9600	QuickLink II
Practical Peripherals	PM9600FXMP	$249	V.42bis, MNP 5	9600	9600	QuickLink II
	PM14400FXMT	$299	V.42bis, MNP 5	14,400	14,400	QuickLink II
	PM14000FX PKT	$499	V.42bis, MNP 5	14,400	14,400	QuickLink II
	PM14000FXSA	$549	V.42bis, MNP 5	14,400	14,400	QuickLink II
PSI Integration	Comstation 5	$495	V.42bis, MNP 5	14,400	14,400	Faxcilitate
Supra Corporation	SupraFaxModem V.32bis	$230	V.42bis	14,400	14,400	Faxstf, Microphone LT
Telebit Corporation	T3000	$949	V.42bis, MNP 5	14,400	9600	none
	WorldBlazer	$1099	V.42, MNP	14,400	9600	Faxstf
Twincom	14.4 Pro	$399	V.42bis, MNP 5	14,400	14,400	Faxstf, QuickLink II Data
	Voyager 14400 Pocket Data + Fax Modem	$499	V.42bis, MNP 5	14,400	9600	Faxstf, QuickLink II Data
U.S. Robotics	Mac Fax Sportster	$329	V.42bis, MNP 5	14,400	14,400	Faxstf, Microphone LT
Zoom Telephonics	ZoomFax Modem VFX v.32	$349	V.42bis, MNP 5	9600	9600	Faxstf, Microphone LT
	ZoomFax Modem v.32bis	$379	V.42bis, MNP 5	14,400	14,400	Faxstf, Microphone LT

Technical-support ratings are based on a series of calls made to each company by Macworld staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's sup derive the final rating. Ratings are for companies, not individual products, and we call only those companies whose products Macworld Lab tests.

panel, warranty, and support.

Size Most of the modems we looked at fit neatly beside or near a Mac or under a telephone. But there are exceptions. The Telebit modems are huge, measuring 13 by 8.5 by 2 inches. They're designed to work primarily as heavy-duty data modems, offering support for leased telephone lines; the fax capability is an afterthought. Consider them for a business where you need a workhorse of a modem, not for personal use.

Durability The MacProducts USA Magic Fax Modem VFX V.32bis and the entire Zoom Telephonics product family come encased in flimsy plastic, and I wonder whether they'd survive the 3-foot fall from my desk to the floor. All others are built from sturdy plastic or metal.

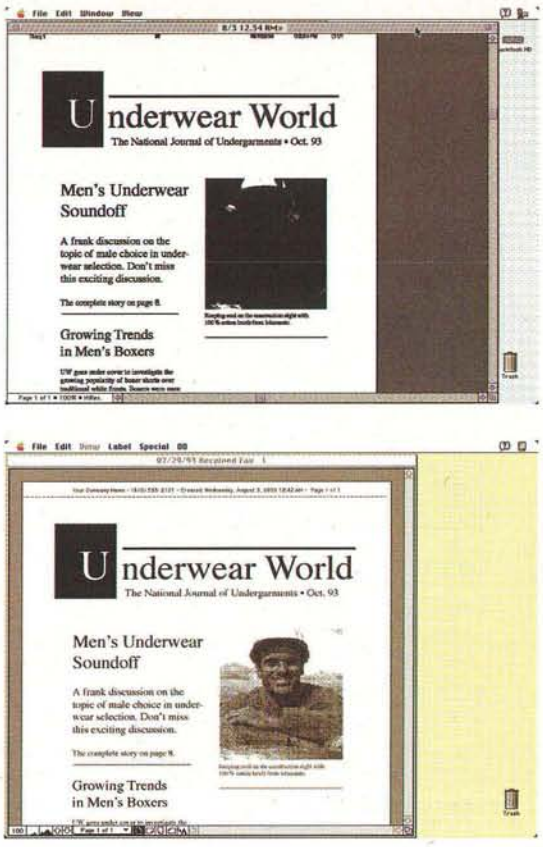
Portability If you're looking for something that you can stuff into your PowerBook's carrying case as well as put on your desk, several companies offer easily portable fax modems. At about the size of a cheeseburger are the Voyager 14400 Pocket from Twincom and the Spectra-Com P14.4 from Bay Connection. Both come with handsome plastic carrying cases. The Practical Peripherals PM14400 and the Micro Electronic Technologies 9696PF are even smaller, nearly the size of a small bag of french fries. The Spectra-Com and the four Practical Peripherals also have the added advantage of running off a 9-volt battery.

Indicators Another important design aspect is the panel of status lights on the front of the fax modem. Most vendors provide the standard set of LEDs that let you know when the modem is sending or receiving information, as well as when it is operating at a high speed and when the phone is on or off hook.

Some vendors have taken to replacing these LEDs with cute little icons. I am used to the typical array of LED and their codes (like *CD* for carrier detect, *SD* for send detect, *RD* for receive detect, *OH* for off hook, *AA* for auto answer, and *HS* for high speed), which Hayes made into the standard interface more than a decade ago for early DOS PC and Apple II modems.

The flashing bunny on the Global Village fax modem takes some getting used to, and the icons used for Computer Peripherals' Viva 14.4/Fax are confusing; they look more like flashing trash cans than like send and receive symbols.

The Supra line uses a two-character LED display to indicate the status of your connection, such as *FX* for fax, *TX* for transmitting data, and *14* for 14.4-Kbps speed.



Viewing Quality Compared The translation from a fax's 200-by-100-dpi standard resolution to a Mac monitor's near-72 dpi causes poor fax viewing for most applications (top, using Faxstf). But Global Fax uses special tricks to make the image easier to see (bottom).

Special Features

Many fax modem vendors offer added features. Some such features are built into the firmware (operating instructions) of the chip set and are controlled by software, while others are in the fax software or in the hardware design.

File translation A fax is only as valuable as the data it contains, so it's not surprising that all the fax applications include some kind of file-conversion capability. The benefit of this feature is that you can take an image or text from a fax and convert it to a popular Mac graphics format such as PICT or TIFF. Global Fax, Faxcilitate, and Faxstf also have OCR options.

Carrying cases Some fax modems feature small carrying cases designed to make them portable, for use with PowerBooks. These include the Archtek SmartLink 1414R Pocket, Bay Connection Spectra-Com P14.4, Micro Electronic 9696PF, Twincom Voyager 14400, and Practical Peripherals PM14000FX PKT.

PC compatibility All the fax modems we tested can be used with a DOS PC. In fact, most fax modems are primarily sold to PC users, with the Mac market a secondary consideration. All that's required for PC usage is the correct cable (Macs use one type of serial-cable connector, PCs use another; adapters are available at computer stores) and DOS or Windows

Phone	Toll-Free Phone	Tech-Support Rating
818/912-9800	800/368-5465	unacceptable
818/912-9800	800/368-5465	unacceptable
813/530-2000	800/554-4996	unacceptable
408/270-8070	800/475-8329	unacceptable
603/880-4000	800/447-4448	poor
805/499-5751	800/854-7600	unacceptable
415/390-8200	800/736-4821, ext. 383	poor
415/390-8200	800/736-4821, ext. 383	poor
404/840-9200	none	unacceptable
404/840-9200	none	unacceptable
805/388-8991	none	not tested
805/388-8991	none	not tested
512/476-5295	800/622-3475	unacceptable
508/435-9057	800/766-7466	very good
612/785-3500	800/328-9717	unacceptable
612/785-3500	800/328-9717	unacceptable
805/581-4000	none	good
805/497-4774	800/442-4774	good
805/497-4774	800/442-4774	good
805/497-4774	800/442-4774	good
805/497-4774	800/442-4774	good
408/559-8544	800/622-1722	unacceptable
503/967-2410	800/727-8772	unacceptable
408/734-4333	none	unacceptable
408/734-4333	none	unacceptable
919/395-6100	800/666-2496	unacceptable
919/395-6100	800/666-2496	unacceptable
708/982-5001	800/342-5877	unacceptable
617/423-1072	800/666-6191	unacceptable
617/423-1072	800/666-6191	unacceptable

technicians. Macworld uses a point system, including bonuses and demerits, to

BEHIND OUR TESTS

MW LAB Macworld Lab took a different route in evaluating fax modem performance this time than we have in previous evaluations. In the past, we simulated noisy telephone lines and tested how well fax modems could transmit data on them. This tested a fax modem's ability to work under different line conditions. But this method is an indirect assessment, so we now use a more direct method.

We used each fax modem to send three test TeachText documents (one each at 9600 bps, 4800 bps, and 2400 bps). (We used TeachText to avoid any incompatibilities with a particular word processor.) We transmitted the documents via a line simulator set for no noise to a DOS PC running simulation hardware and software from KTT Telecom, a Bagnolet, France, developer. The PC then sent the codes needed to make the fax modems step down to a different transmission speed; these codes are what fax modems use when they detect noisy lines. The slower speed lets fax modems filter out line noise more easily. The benefit of this approach is that it guarantees that each modem steps down to each transmission speed, from 14.4 Kbps (if supported), to 9600 bps, to 4800 bps, and finally to 2400 bps.

All fax modems performed similarly in transmitting our two-page test document at 9600 bps, as the benchmarks "Assessing Fax Modem Performance" show. But we found that not all the fax modems were capable of stepping down to 2400 bps and therefore could not complete a transmission at that speed.

We did see differences in the imaging of documents—viewing a received fax on screen—based on the software bundled with the fax modem, as the results in "Assessing Fax Modem Performance" show.

Telecommunications consultant Warren Henderson of Henderson Communications (909/788-8849) assisted Macworld Lab in the test design.—**Macworld Lab testing supervised by Matthew Clark**

fax software. Global Village is the only vendor to limit its focus to Macintosh users, although its fax modems will work on a PC if you have the right serial-cable adapter, you can get one from your local computer or electronics store.

Mode Switching Something else to look for is the ability for the fax modem to automatically switch between data mode and fax mode for incoming calls. This now requires a separate detector box, but some fax vendors have said they expect to add it to future products.

Network and leased-line use There are a few fax modems aimed at network and leased-line use; their higher cost is justified if you regularly exchange large amounts of information over dedicated lines. Such fax modems include the Circuit Research Corporation FlexFax Ultra and the Multi-Tech Systems and Telebit Corporation units. The Telebit WorldBlazer has a proprietary data-compression algorithm that supports data and fax exchange at up to 23 Kbps.

Installation and Support

The PSI Integration, Practical Peripherals, Global Village, and U.S. Robotics units all have excellent documentation and very Mac-oriented installation procedures. At the other end of the spectrum is Hayes's Optima line, whose review unit had no Mac-specific installation instructions and no Mac cable or fax modem software; as we went to press, Hayes began including the necessary Mac cable and fax software.

In our anonymous testing of vendors' technical support, we found that the modem vendors are not very Mac-proficient. Only PerfectData Corporation, Micro Electronics, and Practical Peripherals had good or very good support. And many just weren't helpful, simply referring us to the fax software manufacturer for answers to what we thought were hardware-related problems. That doesn't help much, since we had unacceptable responses from STF Technologies, which handles support for Faxstf. Smith Micro (developer of QuickLink II) offered satisfactory responses. The ratings appear in the table "What Fax Modems Offer."

Choosing a Fax Modem

Because the internal hardware is essentially the same and the software choices are limited, you should give great weight to price and reputation when buying a fax modem.

For traditional desktop devices, Supra has become well known as an industry leader offering bargain prices for a decent product. In fact, its aggressive pricing on 14.4-Kbps fax modems has forced many competitors to lower their prices so much that they can't profitably sell their 9600-bps fax modems, causing several to be discontinued. Practical Peripherals also has a well-rounded line that should fit the bill in most corporate or home environments. Note that the more expensive Practical models have the same functions as the cheaper models; the differences are just the casing and LED panel. AT&T Paradyne Division has a wonderfully low price on its well-crafted 14.4-Kbps modem.

Global Village has achieved an outstanding reputation in the marketplace as the leader in the Mac fax modem world, but you pay a premium for this reputation—the Global Village modems cost $100 more on average than most other vendors' equivalent modems. (There are a few—like the PerfectData Corporation EasyModem 144 and Hayes units—that cost even more than the Global Village units but offer no more.) The extra money is worth the time you'll save in preparing your documents, but if you find that your fax volume isn't that great, you should consider one of the cheaper alternatives combined with Faxstf. ■

HIGH-SPEED FAX MODEMS

MW EDITORS' CHOICE Because the basic hardware is so similar, we gave the bundled software, price, and overall design much weight in selecting our top picks. We normally factor in technical support, but the scores were so low that no product would have qualified. Given the commodity nature of these products, we believe that support is not a critical buying factor, although it is important.

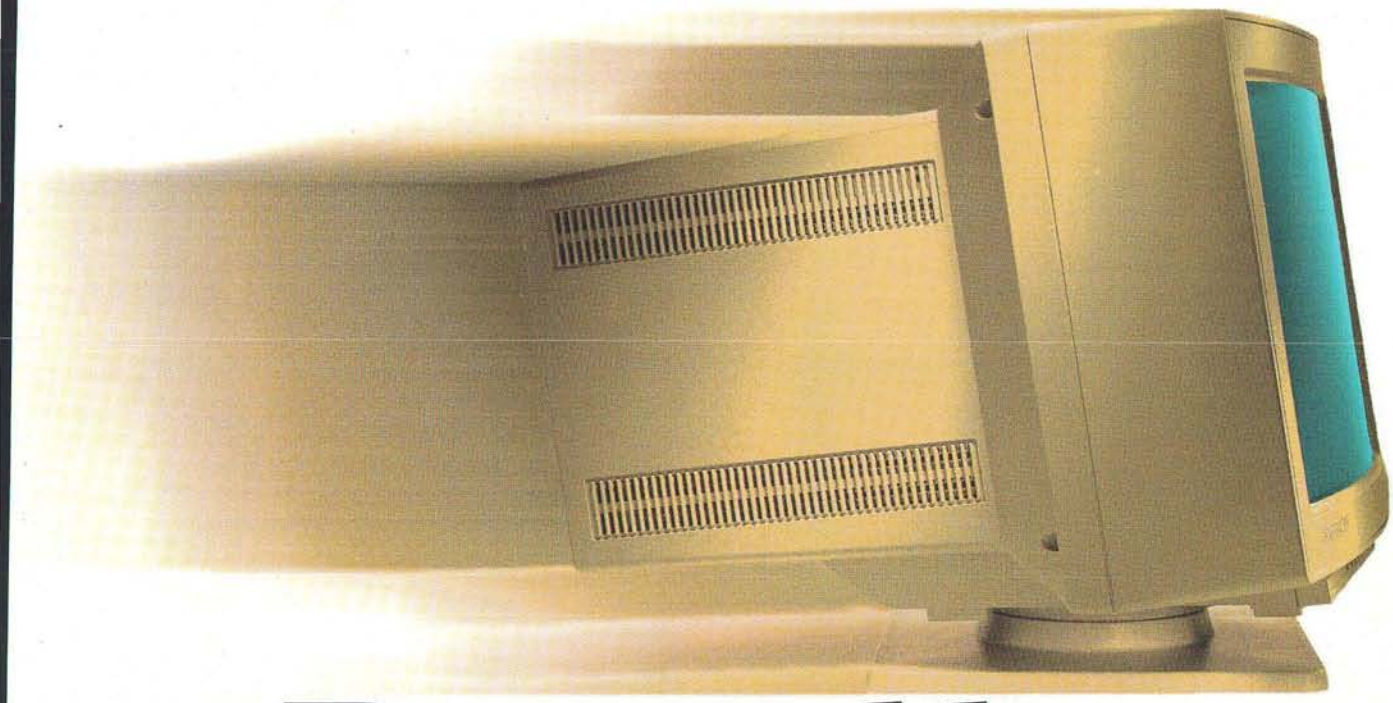
Hardware/Software Combination:

Teleport Gold and Silver with Global Fax While these fax modems (which run, respectively, at 14.4 Kbps and 9600 bps for both data and fax speeds) are more expensive than others, you really do get what you pay for in improved imaging and viewing features. But technical support was poor. **Company:** Global Village Communication. **List price:** Gold $499, Silver $429.

Software Only

Faxstf If you buy a low-cost fax modem, make sure the full-featured Faxstf is bundled with it, or else buy the program separately. But don't expect good technical support. **Company:** Telefocus. **List price:** $79.

We taught the Mac to do something no Mac has ever done before.



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Introducing PaintBoard Turbo XL, the hot new accelerated 24-bit display adapter developed by RasterOps.® Turbo technology that delivers sophisticated color management to your desktop at breathtaking speed. And a breakthrough price. Only $1899, excluding driver's side airbag. The PaintBoard Turbo XL is fully 20-63 times faster than standard QuickDraw.™ And, thanks to a 9-bit digital-to-analog converter, your true colors will always come shining through. This amazing 7″ card supports resolutions as large as 1152 x 870, on monitors up to 21″. It even incorporates hardware pan and zoom features for smooth scrolling and impressive magnification of up to 16x. So make tracks to your local reseller, or call us fast at 1-800-SAY-COLOR. And burn rubber. Not money.

{ The PaintBoard Turbo XL }

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Circle 90 on reader service card

The Statistical Dif

There is a Mac statistics program to fit everyone's needs

by Charles Seiter

Statistics are the fundamental mathematical language of the modern world. Many well-educated people pass through life without mastering partial differential equations, but they probably can't get a second-grade teaching credential, find a job in marketing, or even interpret news stories about health issues without some statistics background. Fortunately, the best statistics programs in the world are available on the Macintosh, and the Macintosh versions of these programs are usually the easiest to use.

Most statistical software has its origins in character-interface programs written for mainframes long ago, and there's been a long programming evolution to take advantage of all the Macintosh has to offer. Six years ago simple teletype-style tables constituted the output of most programs; now QuickTime movies of data plots show how much analytical power can be found in graphics.

Another recent change is extensive inclusion of specialized statistics for quality control. About 20 years too late, American industry has reluctantly noticed that the Japanese emphasis on statistical quality control in manufacturing has been one of the main sources of Japan's commercial success. Thus, in the early 1990s, the businesses of the United States have suddenly developed a furious enthusiasm for the control charts pioneered 60 years earlier by the American statistician Walter Shewhart, and statistics vendors are giving U.S. businesses what they want.

Unlike word processors or spreadsheets designed to cover the needs of all users, statistics packages tend to emphasize certain applications and certain kinds of users. I'll describe the personality of each product, and demonstrate that there really is a Mac statistics program to fit anyone's needs.

But first consider one option short of a dedicated statistics program: For statistics on the cheap, owners of Microsoft Excel 4.0 ($495, 206/882-8080) should consider that product's substantial statistical abilities. And for more advanced statistics or better performance than the standard Excel tools, explore the collections of Excel statistical macros offered by Heizer Software (510/943-7667) for $39 to $79.

For those who really need a full-blooded statistics product, here's a look at seven complete packages.

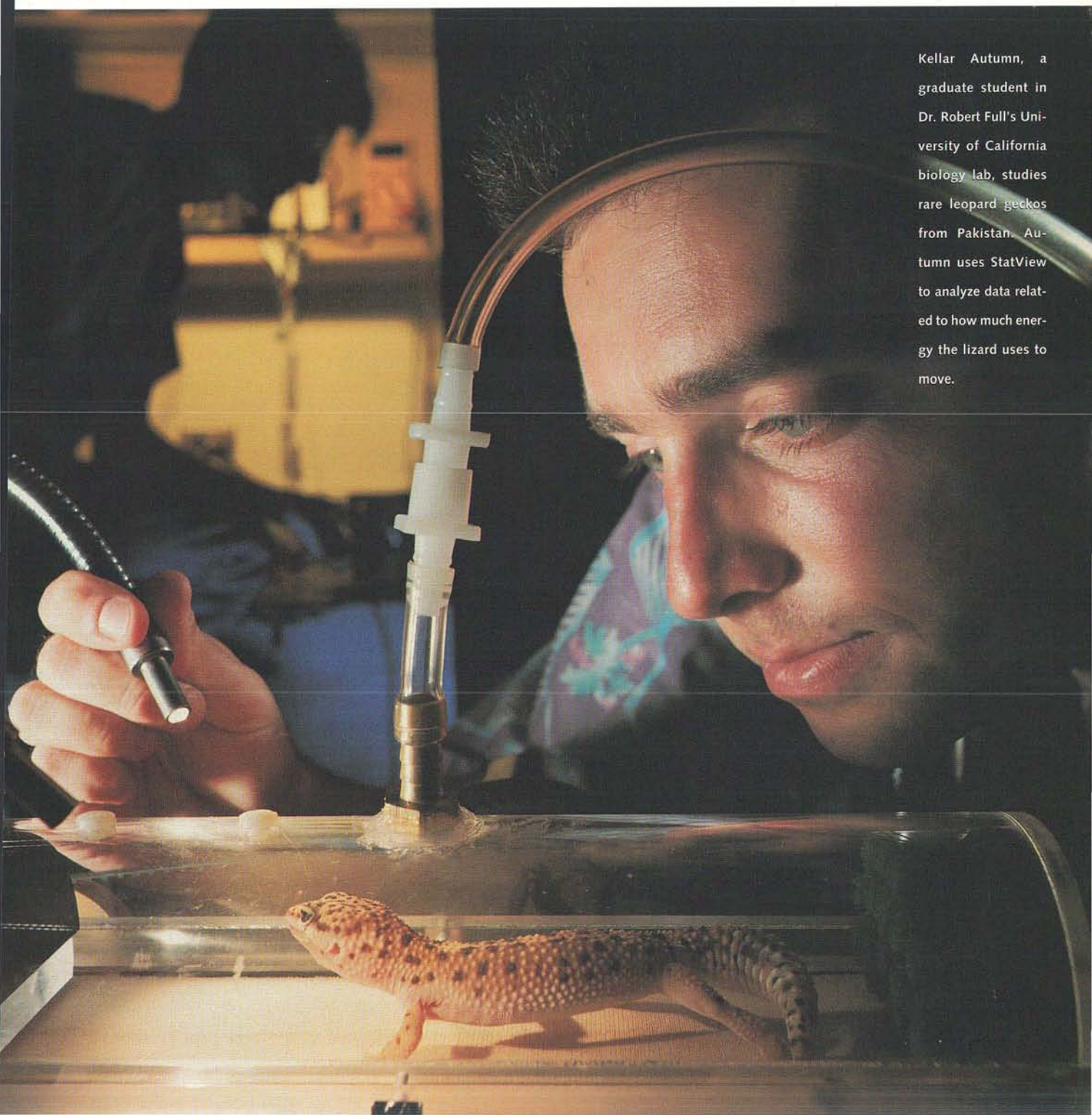
DataDesk

DataDesk 4.1, $595 from Data Description, is fast, compact, and almost obsessively interactive. DataDesk has an extensive test set, including cluster analysis and some time-series facilities. (See "Statistically Significant Differences" for product comparisons; as all products provide basics such as standard deviation and t-tests, those are not listed in the table.)

But a list of tests doesn't show how resolutely modern this program is. From the outside, statistics might seem like a stable, even dusty, business. On the inside it's an area of constant innovation, and DataDesk includes the newest methods. Some DataDesk statistical tests were developed after 1990—contrary to the large majority of statistical tests, which have been around for many decades.

ROBERT HOLMGREN

ference



Kellar Autumn, a graduate student in Dr. Robert Full's University of California biology lab, studies rare leopard geckos from Pakistan. Autumn uses StatView to analyze data related to how much energy the lizard uses to move.

This modernity means a heavy emphasis on exploratory analysis by graphics. DataDesk's imaginative use of color, including 3-D graphs and regression lines (color-coded by data grouping for single-plot analysis of subgroups) makes it possible to see relationships immediately (see "DataDesk Set Sampling"). No other program offers such effective exploratory data-analysis.

A possible drawback of this approach is that if your statistics training came from a traditional textbook, DataDesk will look like a program from another century. There are plenty of features to support traditional statistics, including analysis notebooks to record analysis histories, and a brilliantly implemented outlining feature for ANOVA calculations, but the real application of DataDesk is computer-driven visual analysis of data sets. The enthusiastic tech-support staff will tell you how to do it.

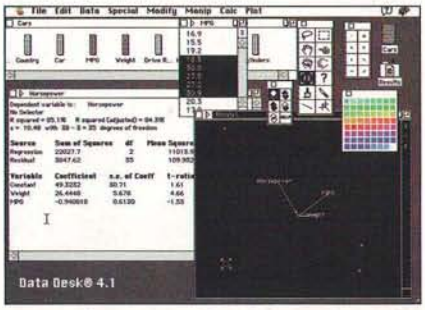
Who needs DataDesk? If you are a researcher looking for the fastest way to make sense of your data (and you don't need a long list of nonparametric tests), DataDesk is the right program. If you do your statistics on a Mac with 4MB of RAM or less, DataDesk is the only statistics program that fits a complete test list into those RAM constraints.

JMP

JMP, $695 from SAS Institute, also exploits the Mac's graphics assets for exploratory statistics. Almost the only sign that it's the product of a company with a mainframe heritage is the presence of special import/export commands that support SAS data-set format.

The JMP perspective is that all statistical analyses are really regression problems. As a result, this is the easiest program to use for regression. You perform data editing and selection in a spreadsheetlike structure, and you simply pick a model type (linear or nonlinear regression, ANOVA, MANOVA) from an icon palette (see "JMP Offers Everything"). JMP then gives you a table of results with full regression diagnostics appropriate to the model. It's fast, and it's so easy to perform an analysis that the program becomes effectively much more interactive than other packages; you can change models with three mouse-clicks, so there's no disincentive to exploration.

JMP includes a huge number of sample nonlinear models, 3-D rotating scatterplots, scatterplot matrices, and Pareto

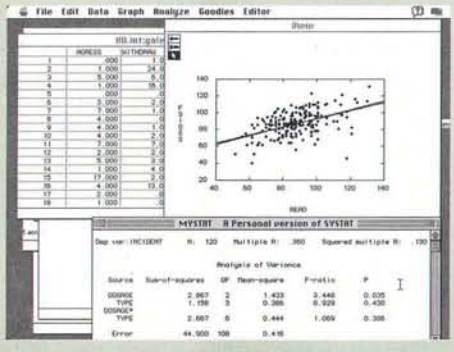


DataDesk Set Sampling DataDesk includes tools for brushing and slicing data sets into Mac statistical graphics—you can pick out cases of interest in a graph and find them in a table, or highlight cases in a table and see them stand out in a graph.

STATS FOR STUDENTS

Students probably make up the largest single category of statistics users, as demonstrated by the tendency of college statistics textbooks to come complete with a basics statistics software program. If you're working independently and aren't dealing with huge data sets, a student program may be more attractive than a much more expensive, full-scale package. In general, look for these packages in university bookstores or order them directly from the vendors.

MyStat, a text-plus-disk combination ($14.25) from Course Technology (617/225-2595), is a subset of SYSTAT that covers beginning through intermediate statistics. If you're taking a statistics course or have simply decided to work through a textbook for reasons of personal enlightenment, it's a very friendly introduction.



MyStat Overview The above regression plot with diagnostic tables shows some of MyStat's wide range of basic statistics capabilities.

StatView Student ($99 from Abacus Concepts) offers the same test set as StatView, with limitations only on the number of cases (500) and variables (50). With student-size data sets, or even a bit of sampling, this limitation is not severe (although it does eliminate the program from consideration by professional statisticians). Like its larger counterpart, the program is especially strong on statistics for social sciences and life sciences.

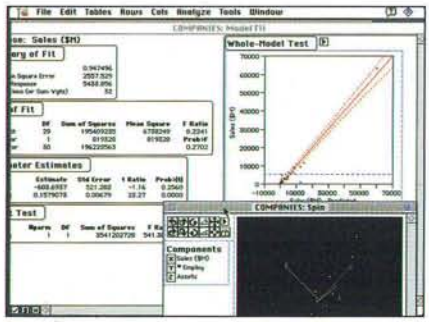
JMP In (from Wadsworth, 606/525-2230, $48.95 for academic users) is the case-limited version of JMP. This impressive bargain offers more tests and a larger number of powerful interface features than most full-scale statistics packages. If you are a student majoring in the physical sciences or engineering, this program could be the best deal you find in four years in college.

InStat ($95 from GraphPad Software, 800/388-4723) is particularly useful for laboratory researchers. It includes standard descriptive statistics, regression and correlation, ANOVA, repeated-measures ANOVA, and six of the most useful nonparametric tests. But the real strength of InStat is its assumption that you probably don't know much about statistics. A series of Help screens for each test lets you decide which test to use and helps you interpret your results, and the manual amounts to a mini tutorial for applied statistics in medical research, biotechnology, and chemistry.

Finally, if you are really on your own, need to learn something about statistics, but don't know where to begin, find a copy of *Learning Data Analysis With Data Desk,* $28.95 from W. H. Freeman (212/576-9400). The book in this combination book-disk package was written by Paul Velleman, designer of DataDesk, and it's the product of Velleman's years of teaching statistics to undergraduates. Although it covers basic descriptive statistics, hypothesis testing, and other staples of Statistics 1A, this product is a unique resource for exploratory data analysis. Working by yourself, you'll find the modern exploratory/graphical approach to data analysis more interesting, more relevant, and easier to learn than the approach in older texts.

and control charts for statistical quality studies. SAS has also introduced a companion product, JMP Design ($295), an experimental design facility particularly suited to industrial and quality-control research. SAS Institute conducts regular training seminars in cities across the country and provides thoroughly competent technical support.

Who needs JMP? JMP is a good choice for users who already have some statistics background—the help facility is



JMP Offers Everything JMP assumes that you want the whole show (regression analysis, complete set of diagnostics, plot with confidence bounds) when you analyze a *Y*-by-*X* data set. That makes it especially convenient in science and engineering applications.

excellent, but the manual assumes you're already familiar with basic statistical tests. It's an excellent match to most science and engineering needs, but it is weaker on statistics for economics (time-series analysis requires a two-step process) and social sciences (only two nonparametric tests and no cluster analysis).

Minitab

Version 8.2 of Minitab, $995, from the company with the same name, features a new interface, includes a competitive assortment of graphics types, and stakes out clear leadership in quality-control statistics.

The interface is entirely menu driven, although you can still type in Minitab commands directly, and a record of the commands you choose from menus appears in the Session window. Although recording commands in 9-point Monaco is hardly Mac-like, this list can be useful for custom analyses of large numbers of data sets. It also lets Minitab easily implement extensions: a set of user-developed scripts for analysis of quality-control problems is included, augmenting the already-strong set of quality-control menu commands. Minitab now supports color graphics, including pseudo–3-D plots (see "Minitab 3-D Graphics").

Minitab has always been a strong all-around program, with legions of devoted adherents, but it appears to have cultivated industrial problem-solving as a specialty in recent years. The program's supplementary manual for quality control is full of realistic examples, and Minitab's customer support has impressive expertise in experimental design for manufacturing.

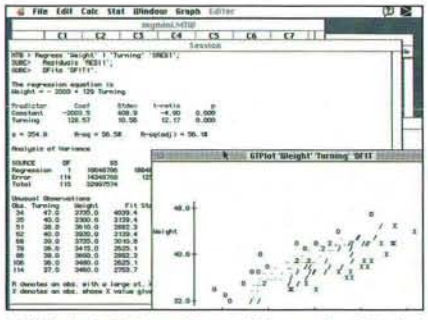
Who needs Minitab? It's the first choice for quality-control statistics. And for offices with diverse hardware—from humble 286 PCs, to the rarer minis (Gould, Kubota), to Silicon Graphics workstations—Minitab is the best cross-platform choice.

WILLIAM R. SALLAZ/DUOMO

Phil Jackson (second from left), coach of the three-time champion Chicago Bulls, gains a competitive advantage by using DataDesk to look for trends and patterns in player and team statistics.

SPSS

SPSS, from the company of the same name, is a huge, complete statistics package with mainframe roots. The basic program costs $498. But the complete product consists of several modules, each of which costs nearly as much as a stand-alone program with a fairly complete set of tests. (SPSS offers discounts for modules, such as SPSS Advanced Statistics for $495, SPSS Tables for $395, SPSS



Minitab 3-D Graphics This pseudo–3-D plot (the *z*-axis is represented by character values for points) reflects a Minitab trade-off—graphics are austere by Mac standards, but Minitab runs on every platform in common use.

Trends for $395, SPSS Categories for $395, and SPSS Graphics (CricketGraph) for $195.)

With these modules, SPSS offers a phenomenal range of tests, however. Consider this: in general, computer magazines make up comparative tables of statistics products by listing all the features in SPSS and then determining which features have been left out of the other software. The documentation for SPSS is about the same size as the documentation for all the other programs in this review put together.

The SPSS interface remains uniquely old-fashioned in Mac terms; it's the last program still using text commands, although the Command Generator helps considerably (see "SPSS Command Generator"). This approach offers one advantage, however. If you can run SPSS on a Mac, you can run SPSS on a VAX. (In contrast, JMP on a Mac doesn't translate to other platforms.)

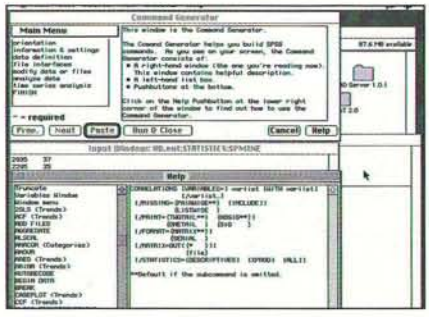
SPSS also really doesn't include graphics per se. There's an interface to Computer Associates' CricketGraph, also sold separately for $195. Therefore, in the SPSS system, presentation graphics are relatively easy, but many specialized types of statistical and exploratory graphics are missing.

SPSS's technical-support staff is extremely competent at statistics, and since the product has almost no Mac-specific aspects, that's all it has to be.

Who needs SPSS? You already know if you need SPSS, since you are probably working with statistics at a large academic, government, or business institution.

Statistica

Statistica 3.1, $595 from StatSoft, offers a set of statistical tests comparable in scope to SYSTAT (reviewed below). When Statistica first appeared, this detailed similarity was a source of some intellectual-property controversy. (Interested readers



SPSS Command Generator The Command Generator window, SPSS's concession to Macintosh style, lets old SPSS hands use the Macintosh. It won't convert Mac fanatics to a command-line view.

should consult *Science*, volume 255, pages 152 to 153, January 10, 1992.) Statistica is relatively easy to use; you can enter and edit data in a worksheetlike structure called a scrollsheet, and you select tests and graphics directly from extensive menus. Statistica, like SYSTAT, consists of a set of modules—you switch between modules to perform different analyses.

The product is a mixture of large ambitions and small implementation problems. It's encouraging to see such a long features list for this amount of money (there's also a $295 subset called Quick Statistica), but documentation for many features is minimal.

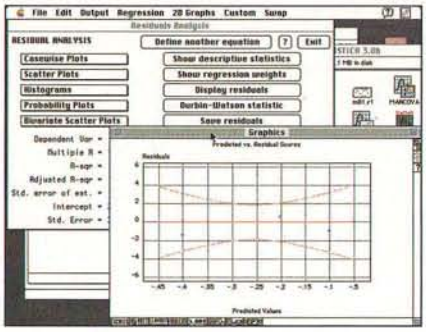
The Statistica manual devotes 89 pages, mostly filled with simple examples, to graphics. For a comparable set of graphics features, SYSTAT issues a separate 600-page manual. There's an admirably complete set of regression diagnostics, but in plotting these I noticed occasional small errors (see "Statistica Chart Error"). The zoom and grow boxes on scrollsheets don't follow Mac interface conventions—grow does nothing, and zoom snaps the window, at the same size, to the upper right-hand corner of the screen.

Who needs Statistica? If you need a large set of tests and graph types, don't require much hand-holding, and operate

Statistically Significant Differences

	DataDesk 4.1	JMP 2.0	Minitab 8.2	SPSS 4.0.4	Statistica 3.1	StatView 4.01	SYSTAT 5.2.1
GENERAL							
Company	Data Description	SAS Institute	Minitab	SPSS	StatSoft	Abacus Concepts	SYSTAT
Phone	607/257-1000	919/677-8000	814/238-3280	312/329-3500	918/583-4149	510/540-1949	708/864-5670
Toll-free phone	○	○	800/448-3555	800/543-6609	○	800/666-7828	○
Price	$595	$695	$995 ($595 academic users)	$498	$595	$595	$895
REGRESSION/ANOVA							
Linear/multiple linear	●/●	●/●	●/●	●/[1]	●/●	●/●	●/●
General nonlinear/polynomial	○/●	●/●	○/●	●/●	●/●	○/●	●/●
1-way ANOVA/n-way ANOVA	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Repeated measures ANOVA	●	●	●	[1]	●	●	●
ANCOVA	●	●	●	●	●	●[2]	●
Factor analysis/principal components	○/●	●/●	●/●	●/●	●/●	●/●	●/●
Logistic regression	○	●	●	[1]	●	○	●
CLUSTER ANALYSIS							
Hierarchical	●	○	○	●	●	○	●
Single/complete/centroid linkage	●/●/○	○/○/○	○/○/○	●/●/●	●/●/●	○/○/○	●/●/●
TIME SERIES							
Linear/nonlinear smoothing	●/●	●[3]/●[3]	●/●	[4]/[4]	●/●	○/○	●/●
Moving average	●	●[3]	●	[4]	●	●	●
Autocorrelation/ARIMA	●/○	○/○	●/●	[4]/[4]	○/○	○/○	●/●
Fourier analysis	○	○	○	[4]	○	○	●
NONPARAMETRIC							
Kendall rank/Pearson	●/●	○/●	●/○	●/●	●/●	●/●	●/●
Spearman rank-order	●	●[3]	●	●	●	●	●
Wald-Wolfowitz/Mann-Whitney U	○/●	○/○	●/●	●/●	●/●	●/●	●/●
Kolmogorov-Smirnov/Wilcoxon	○/●	○/●	○/●	●/●	●/●	●/●	●/●
Kruskal-Wallis/Lilliefors	○/○	●/○	●/○	●/●	●/●	●/●	●/●
Goodman-Kruskal	○	○	○	●	○	●	●
Friedman/Cochran Q	○/○	○/○	●/○	●/●	●/●	●/●	●/○
GRAPHICS							
Pie/bar/line	●/●/●	●/●/●	○/●/●	[5]/●/[5]	●/●/●	●/●/●	●/●/●
X-Y/regression	●/●	●/●	●/●	●/[5]	●/●	●/●	●/●
Density/probability	●/●	●/●	○/○	○/○	●/●	○/○	●/●
Boxplots/stem-leaf	●/○	●/○	●/●	○/[5]	●/●	●/●	●/●
Scatterplot matrix	●	●	○	○	●	○	●
3-D scatter (spin)/surface	●/●	●/○	○/●	○/○	●/●	[6]/○	●/●
Pareto/control	○/○	●/●	●/●	○/○	○/○	[7]/[7]	○/○
Color draw tools	●	○	○	[5]	●	●	●
Color titles/title fonts	●/●	●/●	●/●	[5]/[5]	●/●	●/●	●/●
Label overlays	●	●	○	[5]	●	●	●

● = yes; ○ = no. [1] *With $495 SPSS Advanced module.* [2] *With $100 SuperANOVA option.* [3] *Two-step process.* [4] *With $395 SPSS Trends module.* [5] *With $195 CricketGraph module.* [6] *With $100 MacSpin module; MacSpin sold separately for $295.* [7] *With $100 Quality Control module.*



Statistica Chart Error The error in the *x*-axis label (–.5 should be –.05) values is a jarring note in this Statistica plot. In other respects, Statistica includes a good assortment of chart types.

on a limited budget, Statistica offers the most features per dollar.

StatView

StatView 4.01, $595 from Abacus Concepts, emphasizes presentation features and interface convenience. (Abacus also offers a $295 monochrome version called StatView SE + Graphics for Plus, Classic, SE, and PowerBook 100 users.)

In the latest version Abacus chose not to expand the set of tests at the core of the program—the tests remain nearly the same as those in the earlier versions—but has added object-oriented programming hooks for expansion modules. In line with the new look in American statistics programs, for example, the first (and so far, only) available module is for quality control with superior graphics.

Rather than adding the laundry list of available tests, Abacus has loaded StatView with drawing tools and graph-modification tricks. Text annotation and informational drawings float in a separate layer over the statistical graphics, so you can edit text without tampering with the underlying graphic (see "StatView Overlays").

Most graph default settings are good choices, but you can override the settings if needed. It's easier and faster to make the final presentation version of a chart look the way you want it in StatView than in the other statistics programs. It's even better than some dedicated charting programs, for that matter.

StatView features superb user control over the data-editing environment. The original data-editing spreadsheet, browsers containing analyses and results, and variable summary information can be available on-screen simultaneously. StatView also includes templates covering the most useful analysis and graphics examples. In many cases you can import a data set, pick a template, and start tweaking the results for presentation within minutes. Customer support is first-rate, and you can ask to speak directly to the program's designers.

Who needs StatView? If you typically present the results of your statistical labors to an audience as a series of color slides or overheads, StatView is the best bet. Although it includes a respectable set of professional tests, it's simple enough that workers only involved part-time with statistics won't have to remember much between sessions. The downside of this simplicity: cluster analysis and 3-D exploratory graphics aren't included in

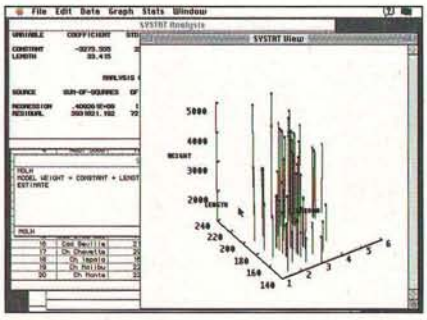
StatView Overlays StatView offers a graphics overlay that can contain annotations or other information graphics. This makes StatView charts easy to dress up for presentations.

StatView, and only one time-series test is offered. (Abacus sells MacSpin, a 3-D product, separately for $295.)

SYSTAT

SYSTAT, $895 from SYSTAT, has developed over the years from a command-line-interface program to one operated almost pictorially. It originally included a large assortment of pure statistical graphics, in black and white, but now offers many presentation-graphics features, including automated generation of QuickTime data-movies. Continuous refinement of the statistics engine has yielded a faster, more compact program.

Version 5.2.1 contains SYSTAT's traditional long list of statistical procedures (see "SYSTAT Spikes"). A built-in



SYSTAT Spikes SYSTAT includes every type of statistical plot you're likely to need, as well as some you may not (Voronoi tesselations, for example). Favorites such as this 3-D spike plot are included, along with a command window for batch analysis.

programming language can help add anything left off the list. Although the interface is a model Mac implementation (you could almost run this program without speaking English), the program still records menu actions and choices in a text file for automated repetitive testing. (These characteristics have also trickled down to the smaller companion product Fastat, at $495 a nearly complete version of SYSTAT limited to 150 cases.) The manual is uniquely readable, the technical-support staff is well informed and diligent, and large SYSTAT user groups exist in most major cities.

Who needs SYSTAT? SYSTAT is a highly refined, comprehensive, all-in-one package with versions for other platforms. It's an excellent choice for general-purpose professional statistical computing.

Something for Everyone

The trends in Mac statistics programs are fairly clear—in a few years these programs will support nearly every feature in our table, they will handle massive data sets using virtual memory, and they will offer more color graphics and presentation features. Even now, however, with high-end Macs featuring workstation performance and nearly every statistics program sporting a respectable Macintosh interface, data analysis might become the most stimulating part of your workday. ■

Contributing editor CHARLES SEITER taught college statistics classes for several years and uses a mix of statistics products in designing and testing scientific equipment.

STATISTICS SOFTWARE

MW EDITORS' CHOICE

With several good competitors, the selections were difficult. We narrowed it down to the two most critical factors—exploratory data analysis and overall versatility.

Exploratory Data Analysis

DataDesk 4.1 With its choice set of exploratory features and speedy performance, this product makes you want to try lots of data views. **Company:** Data Description. **List price:** $595.

Comprehensive Package

SYSTAT 5.2.1 SYSTAT has all the tests you need within a good Mac interface. It features first-rate documentation as well. **Company:** SYSTAT. **List price:** $895.

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12655 .....Total Baseball, The Family Doctor, Multimedia Audebon Birds, Multimedia Audubon Mammals.....69

Dark Power

After Dark 2.0 prevents screen burn-in with fascinating and amusing visual effects. The basic package comes with things like lightning bolts, abstract art, fractals, flying toasters, etc. More After Dark has over 25 new displays to make After Dark's screen tricks even more fun. Art of Darkness is a complete how-to manual for After Dark that is indispensible for modifying and even making your own screen blankers.

12491 ....AfterDark/Art of Darkness Book 33
12490 ....More AfterDark/Art of Darkness Book.....28

Get More Power

Get more power for your PowerBook in two ways. BTI's battery charger will help charge your batteries to full capacity. Connectix's CPU will extend your battery life and keep your computer up and running longer.

12014 .....BTI Charger & CPU.....69

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12013 ..Zoom AFX 24/96 modem w/ WealthBuilder ...89
12331 ..Zoom AMX 2400 modem w/ WealthBuilder...69

Security and Fun

Utilitron's Guaranteed Undelete can put an end to accidental file loss. Inline Design's Redux will make your back-ups a breeze. And Tessarae will let you unwind and have some fun after you secure your data.

12591 .....Guaranteed Undelete, Redux, and Tessarae.....49

Square Deal

If you haven't moved up to System 7, here's the perfect opportunity! Square One is an application (not an init) that puts everything you do on your Mac in one easy-to-reach floating palette. Put all your files and programs at your finger tips.

12272 .....System 7 & Square One 99

Reach Out

DayMaker 2.0 combines scheduling, to-do lists, calendars, alarms, Gantt charts, and phone and address lists. Send and receive faxes from your PowerBook with the DoveFax PB 96/48 fax /2400 data modem. DoveFax PB allows you to fax without interruption from any Mac application.

12052 DayMaker & DoveFax PB Modem.....125

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12574 ..PowerModem Two & FaxMania Covers 229
12573 ..PowerModem Three & FaxMania Covers....325
12572 ..PowerModem Four & FaxMania Covers.....359

Remote Control

ScreenLink lets you control a remote Mac by connecting over an AppleTalk network or over ordinary phone lines through a modem. CPU extends your PowerBook battery life and helps you use batterys more efficiently.

11883 .....ScreenLink and CPU.....69

Kensington Microware
PowerBook Travel Case and PowerBook Numeric Keypad

12289 PB Travel Case/PB Numeric Keypad 119
12313 PB travel Case, PB Numeric Keypad, MicroSaver Security Kit.....149

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3982 ...PowerPad, Granite w/CPU 95
7419 ...PowerPad, Granite w/QuicKeys ..119

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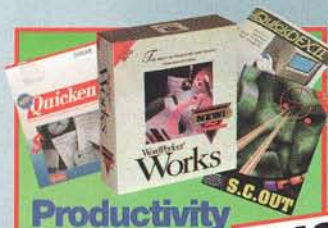
12353 .....PhotoShop and KPT.....599



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11152...(1) 8 MB SIMM - 72-pin/70ns 299

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11493...(1) 8 MB RAM 72-pin 60ns..... 379

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2520.....DG90m DDS Tape Cartridge..... 16

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7757.....FaxModem AFX - 24/96/S, 48/R..... 74
3576.....FX9624V 24/96 S/R fax, V.42, V.42bis ..119
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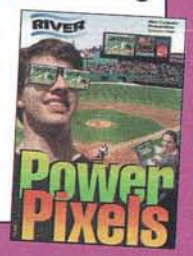

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Graphics

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Paint Alchemy Customizes Effects

XAOS TOOLS HAS RELEASED PAINT Alchemy ($99), an Adobe Photoshop plug-in that lets you create and apply a wide variety of highly customizable special-effects brushstrokes to selected areas of an image.

A streamlined version of Xaos's image processing software for Silicon Graphics workstations, Paint Alchemy includes 76 predefined styles and 36 brushes. Each style can be completely customized with 30 controls within five "Control Cards"—Brush, Color, Size, Angle, and Transparency. To further personalize the special effects, you can also create brushes from any PICT file. You can even define control settings relative to an image's attributes—such as tying brush size to the image's brightness. Controls include density, jitter, layering variations, hue, saturation, and brightness.

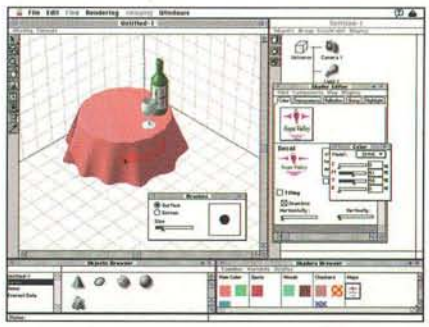
Paint Alchemy works with Photoshop 2.1 or later and any program that accepts Photoshop plug-ins. Xaos Tools, 415/487-7000, 800/833-9267.—CATHY ABES

DIANE FENSTER

Ray Dream Unites Designer Modules

RAY DREAM DESIGNER 3.0, WHICH is expected to ship this September, now has its modeling and rendering modules, LightForge and SceneBuilder, combined into one application. Because you no longer have to switch between modules, you can drag and drop objects into a scene and directly manipulate them—positioning them and adding colors and textures.

Designer's new 3D Paint feature lets you select colors and textures to paint directly onto 3-D objects; those colors and textures automatically conform to the geometry of the object underneath. A paint stroke is actually an object—on its own layer—that you can move around independently of other objects, colors, and textures. And because everything in a scene is always editable, you can endlessly change the scene and render countless versions of it.



In Ray Dream Designer 3.0, paint strokes can be moved and manipulated endlessly within a scene.

Designer will ship with expandable libraries of editable 3-D objects and surface properties (including textures). You'll be able to import DXF or PostScript objects, and textures in any of the common bitmap formats.

Final pricing wasn't set at press time but is expected to be under $400. There will also be a free upgrade for registered users who bought the product after July 15. Ray Dream, 415/960-0765.

—CATHY ABES AND GIDEON YAFFE

Multiformat Film Scanner Under $8000

TOM GIBSON

Microtek ScanMaker 45t

MICROTEK LAB HAS INTRODUCED the ScanMaker 45t, which it claims is the first multiformat film scanner priced under $8000. The $7999 scanner handles 35mm, 4-by-5-inch, 2¼-by-2¼-inch, and 5-by-5-inch film sizes at a maximum optical resolution of 1000 by 1000 dpi, and 2000 by 2000 dpi through interpolation. The single-pass scanner digitizes images at 36-bit color and 12-bit gray scale.

The 45t ships with the complete Adobe Photoshop and Microtek's Custom Calibration Utility, which uses Kodak Ektachrome color standards to build calibration profiles for use with Microtek's Photoshop plug-in.

Microtek has also released the ScanMaker 35t ($1999), a compact 35mm slide and negative film scanner. The 35t scans a maximum optical resolution of 1832 by 1832 dpi, 3656 by 3656 dpi interpolated, in 24-bit color or 8-bit gray scale. The 35t is bundled with Adobe Photoshop LE. Both scanners ship with a ColorSync profile.

Microtek is also shipping the Transparent Media Adapter ($799), which allows ScanMaker II models to scan transparencies, and SnapPrint ($1499), a continuous-tone color-proof printer that produces Polaroid prints of digital images for about $1 per print.

The company is developing ScanIndex, which scans business cards, reads the text through OCR software, and places data from the cards in corresponding database fields. ScanIndex will be available for the Mac later this year for under $400. Microtek Lab, 213/321-2121, 800/654-4160.—JOANNA PEARLSTEIN

Better Photoshop Color-Matching

EFICOLOR FOR ADOBE PHOTOSHOP—Core Pack, just introduced by Electronics for Imaging (EFI), is designed to let professional designers turn their color printers into color proofing devices. Core Pack is a set of ten color-separation tables that override Photoshop's conversion mechanism to convert images between RGB, Lab, and CMYK modes. Through access to the EfiColor Color Management System, Core Pack enables you to color-match a variety of display and output devices—including the Hewlett-Packard PaintWriter XL, the Kodak XL7700, and the QMS ColorScript 100—directly from within Photoshop.

The product also supports calibrated monitors, for improved screen-to-print results. EfiColor for Adobe Photoshop—Core Pack requires Adobe Photoshop 2.1 or later and retails for $199. EFI, 415/286-8600.—CATHY ABES

IN BRIEF

■ **Kodak's Color Proofer** Kodak is now shipping the XLS 8300, a 300-dpi thermal dye-sublimation printer designed for color proofing as well as final output of Photo CD files. The $10,995 printer has 16MB of memory and a RISC processor, and can print in sizes up to 9½ by 12 inches. 716/724-4000; 800/242-2424.

■ **Stock Photo CDs** Digital Stock Professional is a library of 20 CD-ROMs containing full-color, Photo CD–format photographs. Each disc costs $249 and focuses on one subject; every image is stored in five resolutions, up to 3072 by 2048 pixels. Usage rights include advertisements and presentations. Digital Stock, 619/271-6525, 800/545-4514.

■ **Image Club's Fonts** Image Club Graphics' newFaces Spring 1993 collection of 11 PostScript and TrueType fonts includes 2 Art Deco–era typefaces, as well as 2 original fonts. The fonts are $19 or $29 purchased separately; the collection is $109. 403/262-8008, 800/661-9410.

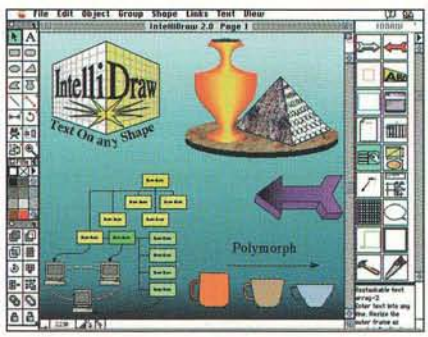
■ **upFront's Price Goes Down** Alias's new version of upFront, a 3-D draw package, enables you to create 3-D shapes and objects using familiar 2-D draw tools, and to easily generate QuickTime animations. With version 2.0, Alias has lowered upFront's price from $425 to $299; upgrade is $50. 416/362-9181, 800/447-2542.

■ **PageMaker and Process Colors** Pantone has announced that both the Mac and PC versions of Aldus PageMaker 5.0 will support the Pantone process color-matching system. PageMaker 5.0 was set to ship in August for $795. Aldus, 206/622-5500.

IntelliDraw Eases Template Access

ALDUS'S UPDATE TO ITS 24-BIT COLOR draw program, IntelliDraw, emphasizes new drag-and-drop features that enable you to easily move clip art and other graphical elements stored in the program's template library into a drawing. With IntelliDraw 2.0, you can create templates by dragging an object into a template window; you can assemble a custom template library by dragging objects from various collections into one template window; and you can drag objects from one drawing window into another.

Other new features include polymorphing for blending numerous graphical objects into one image. The resulting graphic contains a sliding handle, which lets you choose any of the image's intermediate shapes, colors, or positions; polymorphs can be saved as QuickTime movies. IntelliDraw 2.0 is expected to ship this fall; final price should be between $200 and $300 but wasn't set at press time (IntelliDraw 1.0 costs $299). Aldus, 619/558-6000.—J.A.M.



IntelliDraw 2.0 includes the ability to drag, drop, and edit objects from the template library (right).

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use as a template.
Sketch is now traced
th Pen tool. ❷ Two
apes that compose ear
constructed with Divide
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ndomizes star points; and
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lected and placed
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Multicolor gradient
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curring where areas
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be colored separately.
❾ Clicking on placed
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Adobe Illustrator 5.0.
llustration by Ron Chan.

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WILD THING

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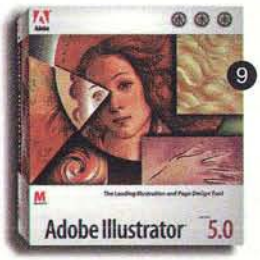

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Expert Graphics

GRAPHICS PROFESSIONALS SHARE THEIR SECRETS

by Cathy Abes

Artist: Glenn Mitsui is a Seattle-based illustrator, who together with his partners, Jesse Doquilo and Randy Lim, runs Studio MD, specializing in digital design and illustration.

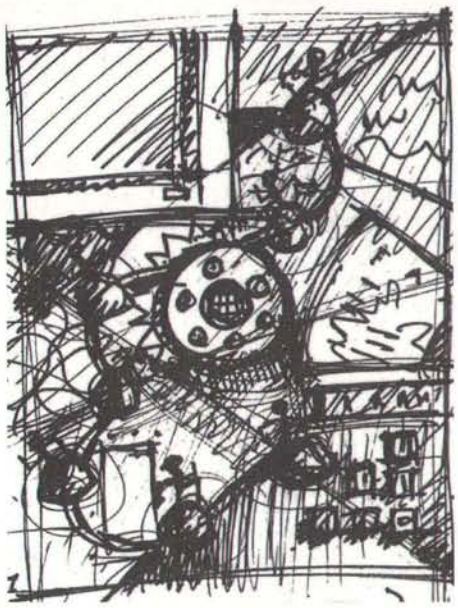
Techniques: For the illustration that opens this month's fax modem feature, Mitsui began with a rough pencil sketch. In FreeHand, he blocked out the image with black lines. Then, after changing it into an Illustrator file using EPS Exchange (a FreeHand plug-in by Altsys Corporation, 214/680-2060 or 800/477-2131), he brought it into Photoshop as a 72-dpi RGB file to rough out the colors for each segment.

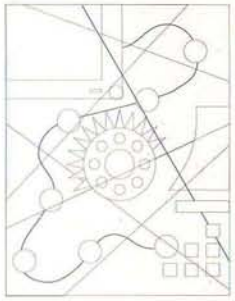
In FreeHand, Mitsui created the rotary dial—complete with 1s and 0s—as black-and-white line art. Before he could bring the 1s and 0s into Photoshop, Mitsui first had to change them from type into graphic objects.

To create the cord that connects the spheres, Mitsui first drew a thick, black line in FreeHand. Then he made it an Illustrator file (again using EPS Exchange) and opened it in Photoshop—as a black line on a white background. After copying the image, he inverted the copy—making it a white cord on a black background—and made the inverted copy into a mask. After pasting the mask into a new channel, he deleted the original RGB file, loaded the mask (with the Load Selection command), and used a 12-pixel feathered edge.

To give the cord a highlighted effect, Mitsui used the Gradients on a Path filter in Kai's Power Tools (KPT), a Photoshop plug-in consisting of numerous special-effects filters.

Mitsui created the yellow type in Photoshop, choosing a yellowish green foreground and a black background. After importing the resulting TIFF file into Fractal Design Painter, he applied a texture to the type that appears in the upper-left corner and recorded the sequence he used. This in effect created a macro that he could use to automatically apply the same texture to anything else. m



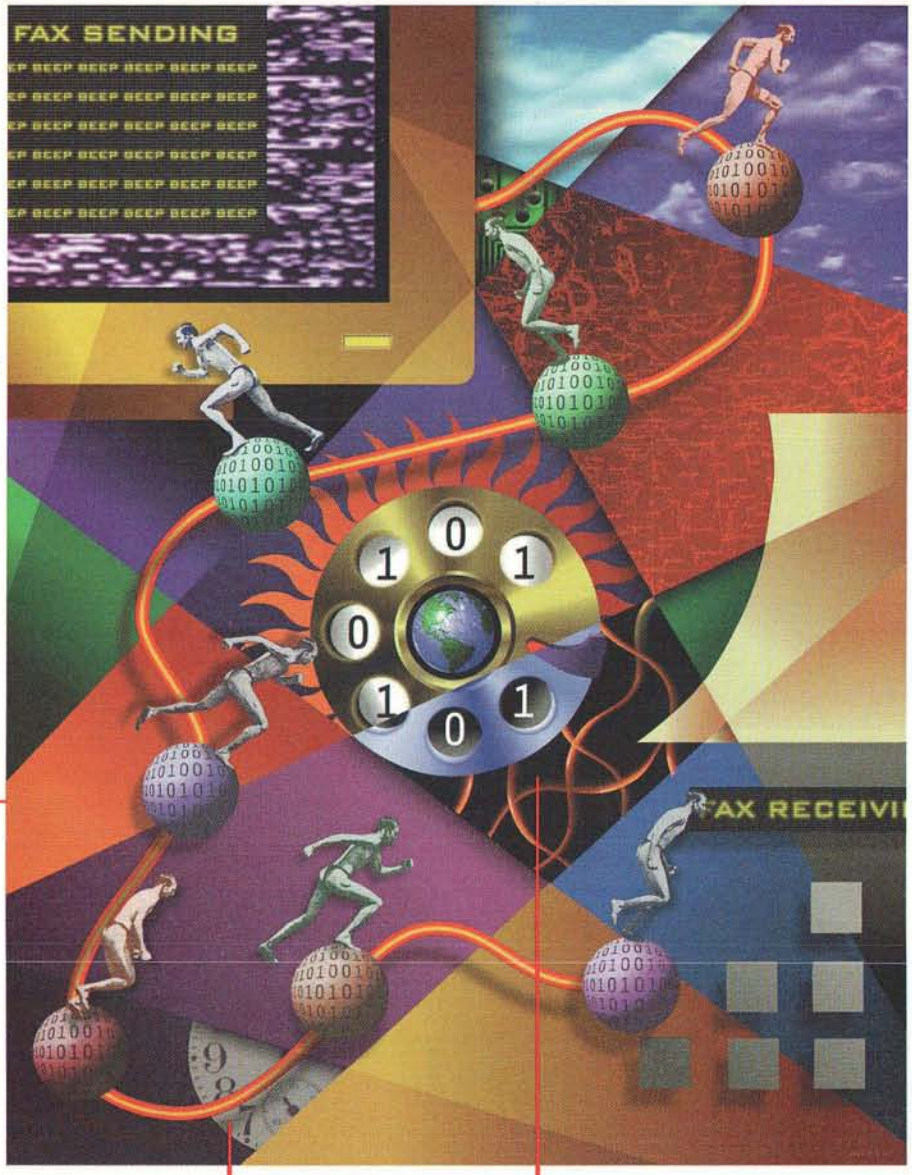


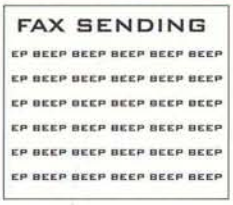
1 At left is the original pencil sketch in which Mitsui mapped out the various sections of the illustration. Below are the line art created in FreeHand and based on the pencil sketch, and the image imported into Photoshop, in which the colors were mapped out.

THE TOOLS

Hardware: Macintosh IIcx with 20MB of RAM; Radius Rocket; 340MB internal hard drive; 24-bit Radius DirectColor/GX accelerated color graphics board; 13-inch AppleColor High-Resolution RGB Monitor; MicroNet 44MB removable-cartridge drive; Microtek 600ZS ScanMaker.

Software: Aldus FreeHand 3.1; Adobe Photoshop 2.5; EPS Exchange; Fractal Design Painter 2.0; Kai's Power Tools.

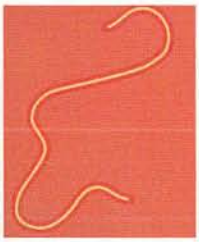




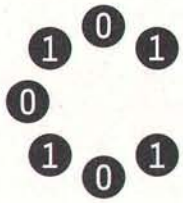
4 In Photoshop, Mitsui typed *FAX SENDING* and the repeating *BEEP*s as one file and FAX RECEIVING as another.

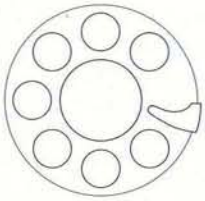
5 In Painter, Mitsui opened the first file. Then he selected the Record Session command (Brush Stroke menu) and chose the line 0 pattern from the Simple Patterns submenu under the Paper palette.

6 After choosing the Apply Surface Texture command at 100 percent opacity and Shiny (Surface Control submenu, Effects menu), he chose Stop Recording Session. (He then used the recorded sequence to apply the same texture to the *FAX RECEIVING* type.)



2 Mitsui made the cord—created as line art in FreeHand—into an Illustrator file and opened it in Photoshop. After duplicating the image, inverting the copy, and making it a mask, Mitsui pasted the mask into a new channel and loaded the selection. After selecting KPT's Gradients on a Path filter, which adds a gradient to any selected area that has been feathered and feathers the gradient outward from the center, Mitsui loaded the selection again, copied it, and pasted it into the illustration.





3 In FreeHand, Mitsui had to turn the 1s and 0s into drawn objects before importing them into Photoshop—using first the Convert to Path command (under the Type menu) and then the Split Element (under the Elements menu).

BY JIM BENSON

GETTING

For designers, photographers, picture researchers, and multimedia developers, the ability to quickly find and use a digital image has never been more important. The emergence of new image-intensive technologies, such as digital photography, QuickTime, and Photo CD, and the decline in hardware prices for desktop scanners and color printers has created a veritable explosion of digital images. To help you archive, catalog, locate, and view all these graphics, regardless of where they're stored—floppies, SyQuest cartridges, Photo CDs, or network servers—a new category of software has emerged: the image database.

At last count, there were nearly a dozen stand-alone image databases (also referred to as imagebases or image catalogers) for the Mac, ranging in price from $99 to $995. To determine which of these programs are the best, I used them to archive and track up to 3000 images saved in more than a dozen different formats across several media: floppies, three hard disks, a SyQuest cartridge, and a multisession CD-ROM drive.

How well do these programs meet expectation? In most cases, they don't quite measure up. Several programs, such as Graphic Detail's Thumbs Up, Northpoint Software's CompassPoint, and GTE ImageSpan's Digital Album, are overpriced and difficult to use. In fact, there seems to be an inverse relationship between cost and quality—in most cases, the more you spend above $300, the more cumbersome the interface. Other programs—Imspace Systems Corporation's Kudo Image Browser, Eastman Kodak's Shoebox, Canto Software's Cumulus, and Tulip Software's MediaTree—do a good job but lack key features or an enticing price. The top two programs, Aldus Fetch and Multi-Ad Search, are powerful, easy to use, and at $295 and $249, respectively, easy on your wallet. For additional reviews of Fetch, Cumulus, Nikon Electronic Imaging's ImageAccess, and Kudo Image Browser, see *Reviews*, *Macworld*, August 1993.

What to Look For

Before delving into the features, flaws, and attributes of each program, it's helpful to understand what image databases do. What follows is a checklist of typical features to look for in an image database. (For more detailed information, see the table, "The Big Picture: Image Databases Compared.")

Create catalogs Image databases generate graphics catalogs; several, such as Fetch and Shoebox, also catalog sounds and QuickTime movies. Ideally, a database automatically creates catalogs by letting you import entire folders or volumes into the program. Both Fetch and Multi-Ad Search, for instance, let you automatically catalog images by dragging an icon of a CD-ROM loaded with images on top of the respective application (Fetch or Search) icon.

View thumbnails Image databases create and store a facsimile, or thumbnail, which shows you what the original image looks like. The thumbnail includes information about an image's size, location, and file format, among other things. Several programs—Thumbs Up, CompassPoint, and Digital Album—compress the original image in order to create thumbnails, or use the compressed image itself as a thumbnail. I don't recommend using compressed images for cataloging, however, because importing can be slow, and the process requires large amounts of memory and storage space.

All the programs display thumbnails in a spread similar to a photographer's contact sheet. However, the most flexible programs give you a number of thumbnail viewing options. If you're working with 24-bit color, for instance, you'll probably want to see thumbnails in either 8-bit or 24-bit. (As you might expect, higher resolutions go hand in hand with slower performance.)

Search for keywords Most programs offer full Boolean keyword searches that help you find images in a hurry; Kudo Image Browser and MediaTree offer only partial Boolean searches, however. Several create basic keywords for you; both Fetch and Multi-Ad Search, for example, give you options for including the file and folder names as keywords as you import images.

Preview images Once you've located a particular image, you can open a full-size preview image (see the screen shot "Shoebox's Slide Show"). The best programs let you zoom in and out on the preview image as well as paste the image (or a portion of it) into another program. In most cases, only a thumbnail is stored in the catalog, so you need to locate the media (floppy, SyQuest, and so on) that the original is stored on to get an accurate (high-resolution) look at the image.

Open the original application Should you want to edit the original image, most of the programs use a ⌘-*key* shortcut to launch the original application that created it. One annoying exception is Kudo Image Browser, where double-clicking on a thumbnail launches the application; that's fine if you intended to open the program, but it's a pain if you double-click accidentally.

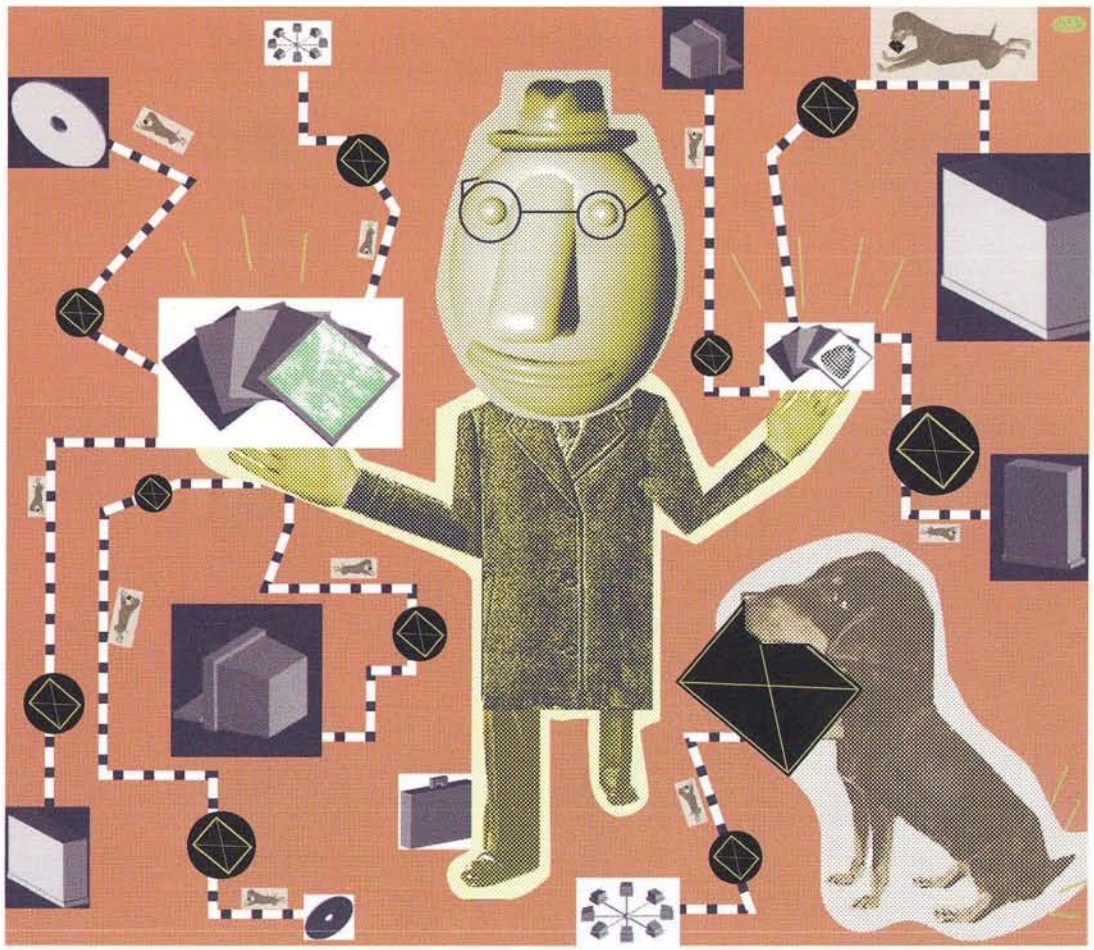
Support multiple file-formats Most image databases recognize PICT, EPS, and uncompressed TIFF formats, but several—Digital Album and CompassPoint, for instance—choke on or flat out ignore RIFF, JPEG, compressed TIFF, and Photo CD formats. Other programs, such as Kudo Image Browser, ship with Claris's XTND translators, letting you open as many file formats as you have translators. The most flexible of the programs in this area is Fetch, which uses a proprietary technology to recognize nearly every Mac graphics file format, as well as QuickTime and sound files.

Support multiple users If you're on a network, you'll want a program with a simple password scheme that lets multiple users access a central catalog. Ideally, several users should be able to open graphics files in a catalog even while a network administrator is adding new images to that catalog. A few programs, such as Cumulus, offer image tracking—the ability to trace who looked at what image and when.

Media Cataloger 1.1

Bargain hunters should appreciate Interactive Media Corporation's Media Cataloger ($99), designed for small graphic arts shops and independent designers. It boasts a friendly, straightforward interface and the ability to create an unlimited number of catalogs, among which you can freely cut and paste images.

Unfortunately, this program's catalog of deficiencies is a long one. Sorting is by file name or type only; there's no editing in a preview window; and you can't launch a graphic file's original application from within the program. In addition, Media Cataloger won't read CMYK TIFF or JPEG files—and won't tell you so. A dialog box led me to believe I was cataloging an entire CD-ROM of JPEG-compressed PICT files at a furious rate when in fact the program was skipping those files. I



THE PICTURE

Macworld picks the best image databases for archiving and locating graphics

only realized what had happened when I discovered an empty catalog.

If you have only a passing interest in image cataloging, and don't want to spend much money, Media Cataloger should satisfy you. Those in need of a feature-packed program, however, will need to keep searching.

MediaTree 1.4

Tulip Software's MediaTree ($248) uses an outliner to organize images. Type in a word for your topic, such as nature, and subtopic, like animals, followed by any further subtopics, such as cats. You then copy images from an existing catalog and paste them into your outline or import them directly into specific subtopics.

This approach to organizing images sounds good, but it requires more work and is less flexible than using keywords and Boolean searches. If you want to restrict your search to a particular file format created after a certain date, for instance, you're out of luck. The outliner's implementation isn't well thought out, either. You can't shift-select multiple images to copy them from the catalog to the outline. And even on a speedy Mac (I used a Mac IIcx with a 33MHz 68040 accelerator) the program was sluggish at copying thumbnails, moving images and categories, and displaying and scrolling preview images.

Multi-Ad Search 2.0

After testing a number of programs that couldn't do what I wanted, using Multi-Ad Search ($249) and Aldus Fetch ($295) was like diving into a cool pool on a hot summer day.

Both programs offer a powerful, simple interface. For example, both make it easy to import images, and both offer a number of options—file type, thumbnail resolution, automatic keywords—that let you choose how to import those images. And they're both easy to learn: you'll be

The Big Picture: Image Databases Compared

	Aldus Fetch 1.0	CompassPoint 1.1.1	Cumulus 1.1	Digital Album 2.0	ImageAccess 1.0
GENERAL					
Company	Aldus Corporation	Northpoint Software	Canto Software	GTE ImageSpan	Nikon Electronic Imagi
Phone	206/628-5739	313/543-1770	415/431-6871	203/965-2525	516/547-4355
Toll-free phone	○	○	800/332-2686	○	800/526-4566
List price	$295	$749	$295 [A]	$485	$495
Common file formats supported	PICT, EPS, TIFF, CMYK TIFF, compressed TIFF, MacPaint, Photo CD, Adobe Photoshop, JPEG, QuickTime, sound, Aldus FreeHand	PICT, EPS, TIFF, QuickTime	PICT, EPS, TIFF, CMYK TIFF, Adobe Photoshop, JPEG, QuickTime, Aldus FreeHand	PICT, TIFF, TARGA, QuickTime	PICT, EPS, TIFF, Adobe Photoshop, JPEG, RJPC
Recommended memory	4MB	6MB	2.5MB	16MB	8MB
IMPORT/PREVIEW					
Opens multiple catalogs	○	●	●	●	○
Maximum number of images per catalog	32,000 [D]	50,000	unlimited	unlimited	32,000
Automatically creates keywords	●	○	●	●	○
Creates catalogs by drag-and-drop	●	○	●	○	○ [F]
Automatically purges identical items	●	○	●	○	○
Original image compressed in catalog	○	●	○	●	○
Thumbnail resolution options	1-bit, 8-bit, 32-bit	8-bit, 24-bit	1-bit, 8-bit, 16-bit	8-bit, 16-bit, 24-bit	8-bit, 24-bit
Opens full-size preview	●	○	○	●	●
Zooms in and out on preview	●	○	○	●	●
SEARCH/RETRIEVE/NETWORK					
Image tracking	○	●	●	○	○
Marks images for fast sorting	●	●	○	○	○
Uses pasteboard for temporary storage	○	○	○	●	●
Renames files when exporting	○	●	○	○	○
Launches original image application	●	●	○	●	○
Supports multiple users	●	●	●	●	○
Multiple users access catalog simultaneously	●	●	●	●	○
Password protection	●	●	●	●	○

● = yes; ○ = no; NA = not applicable. [A] $895 for five or more users. [B] Promotional price of $99 expires October 31, 1993. [C] Displays key frames only. [D] Version 1.2 of Fetch will support 250,000 images in a catalog. [E] Some views are limited to 32,767 items. [F] Version 1.1, due out by the time you read this, creates drag-and-drop catalogs. [G] Version 2.0, due to ship in July, has autopurge feature. [H] Multiple-user support is for searching capabilities only.

up and running in an afternoon with only a few peeks at the manuals.

Multi-Ad Search is fast; the code for version 2.0 was rewritten for speed. You can import images and scroll through previews faster than in any other program. And its searching capability is speedy and smart. I simultaneously searched a 3000-image catalog and a 250-image catalog (Multi-Ad Search is the only program that can do this) for files that were not EPS or TIFF, that contained the keyword *woman*, and that were created after a specified date. Multi-Ad Search displayed the thumbnails that matched these criteria in a matter of seconds.

What's Multi-Ad Search missing? The program doesn't recognize sounds, QuickTime, or Adobe Photoshop files, and it would benefit from a few features found in Shoebox, like customized thumbnails. If you want information about an image stored on an unmounted disk, Multi-Ad Search requests that you mount the disk, whereas Shoebox imports file information with the thumbnail. Despite its deficiencies, though, I recommend Multi-Ad Search for its unsurpassed speed and strong search capabilities.

Aldus Fetch 1.0

Aldus Fetch's major strength is its versatility. It's the most gracious of the programs when it comes to accepting a diversity of file types, including sound and QuickTime. Fetch ($295) also gives you solid thumbnail options, allowing you to choose between 1-bit black-and-white and 8-bit and 32-bit color, and whether or not you want thumbnails compressed as they're imported. This last capability gives you greater control over the size of your catalog and the speed of your thumbnail display (32-bit thumbnails are slower to display than 8-bit).

Those who archive images in JPEG-compressed file format will find Fetch to be a memory hog. To create thumbnails of JPEG-compressed files, you need to have at least three times the largest image's file size in memory. That means if you have a 5MB JPEG-compressed image to catalog, you need to allot 15MB to Fetch (files in the other formats Fetch supports don't require nearly as much memory). And although nearly all the other programs allow multiple open catalogs, Fetch can open only one catalog at a time—a big drawback if you want to cut and paste elements between catalogs.

At press time, a minor update of Fetch was in the works. Among the update's enhancements will be a catalog size of 250,000 images (the current limitation is 32,000 images) and improved handling of JPEG files. Details on pricing and ship dates weren't available.

Kudo Image Browser 1.04	Media Cataloger 1.1	MediaTree 1.4	Multi-Ad Search 2.0	Shoebox 1.0	Thumbs Up 1.3
Imspace Systems Corporation	Interactive Media Corporation	Tulip Software	Multi-Ad Services	Eastman Kodak	Graphic Detail
619/272-2600	415/948-0745	508/475-8711	309/692-1530	716/724-1021, ext. 53	919/833-3366
800/488-5836	○	800/972-9659	800/447-1950	800/242-2424, ext. 53	800/234-8635
$295	$99	$248	$249	$345 [B]	$995
PICT, EPS, TIFF, CMYK TIFF, MacPaint, Photo CD, Adobe Photoshop, GIF, RIFF, QuickTime [C], Aldus FreeHand, sound	PICT, EPS, TIFF, MacPaint, Photo CD, Adobe Photoshop, QuickTime, sound	PICT, EPS, TIFF, compressed TIFF, MacPaint, Photo CD, Adobe Photoshop, GIF, QuickTime, sound	PICT, EPS, TIFF, MacPaint, RIFF, JPEG	PICT, EPS, TIFF, Photo CD, QuickTime, sound	PICT, EPS, TIFF, MacPaint, Photo CD, Adobe Photoshop, JPEG, TARGA
4MB	1.5MB	700K–2MB	3MB	4MB	10MB–16MB
●	●	○	●	●	●
32,767	32,000	unlimited [E]	160,000	unlimited	unlimited
●	●	●	●	○	●
●	○	●	●	○	○
●	○	○ [G]	●	○	○
○	○	○	○	○	●
8-bit	8-bit	24-bit	8-bit	8-bit, 16-bit, 24-bit	8-bit, 24-bit
●	●	●	●	●	●
○	○	○	●	●	○
○	○	○	○	○	●
○	○	○	●	●	●
○	○	○	●	○	○
○	NA	○	○	●	●
●	○	●	●	●	●
○	●	●	●	● [H]	●
○	●	●	●	● [H]	●
○	○	○	●	○	●

Cumulus 1.1

Canto Software's Cumulus ($295) offers a well-implemented network administration mode that shows at a glance a catalog's activity—who's been using the catalog, when they were using it, and what they did.

And with Canto's Cirrus 2.0 ($395) scanning and image-enhancement program, you can scan graphics directly into Cumulus catalogs—a nice time-saving option. Keywords, however, must be entered into a general list and then applied to particular images—a slow and clumsy solution. There's no preview capability, so the largest image you'll see on screen is a thumbnail.

The manual is poorly translated (the software was written in Germany), which is regrettable, since the program's quirkiness requires you to refer to the documentation frequently. And Cumulus is the only program that refuses to catalog different images with the same file name. Since Photo CD file names are all numbered in a similar fashion (01, 02, 03, and so on), this is a major problem if you have multiple Photo CDs.

Kudo Image Browser 1.04

This $295 program from Imspace Systems offers a clean interface and the cool Riffle feature. Like the flip books you made as a kid, the Riffle feature lets you zoom quickly (up to about ten frames per second) through a stack of thumbnails using the mouse to control the speed. Unfortunately, the procedure requires an uncompressed (and therefore a disk-hogging) catalog.

Kudo also boasts a drag-and-drop feature that works like a QuarkXPress or Aldus PageMaker library—to place an image, drag it from the catalog and release it over an open PageMaker or QuarkXPress document. It's a useful feature that works well; Imspace plans to implement the feature to work with other applications as well.

On the downside, Kudo Image Browser can't play QuickTime movies (although it can show a key frame), doesn't support multiple users or full Boolean searches, and offers an overall weaker feature set than most of its competitors in this price range.

Shoebox 1.0

Eastman Kodak's Shoebox ($345) offers a highly customizable thumbnail view that lets you alter the background color, text color, and positioning of thumbnail images. You can shuffle "slides" (the thumbnails look like 35mm slides) within and across catalogs by clicking and dragging.

Shoebox is even more powerful than Multi-Ad Search in its ability to locate images. For instance, you can create your own search categories, such as the number of people in a photo, the photographer, or the location. The program also offers a marking feature that lets you more easily locate and sort desired images by checkmarking them. While Aldus Fetch, Multi-Ad Search, and ImageAccess all offer a text-only list of files for quick scrolling, Shoebox does not.

Searching in Search Multi-Ad Search's Find command lets you locate files using a variety of search options. And you get fast results—the images corresponding to your keyword search appear a moment after you hit the Find key. You can even name a specific search and save it as a menu item.

Shoebox's Slide Show Photographers using Photo CD will feel at home with Shoebox's interface: you can mark thumbnails for later sorting and rearrange them by dragging them to a new location. You can also view your "slides" on any color background—here I chose light gray. The thumbnails are on the right; a preview image is on the left.

Shoebox offers minimal support for multiple users, but it's probably best suited for individual photographers looking to organize Photo CD and other images.

Digital Album 2.0

Digital Album ($485) has a database-like interface, making it a good choice for anyone who needs a data-intensive approach to finding images (if you're searching personnel files that have photos attached, for instance). However, the awkward interface doesn't encourage exploration. Instead of menu items, for example, you get buttons that lead to other windows, and the thumbnail windows lack scroll bars.

In addition, the program imports and compresses entire images and uses them as thumbnails—a procedure that quickly creates a large catalog file. No wonder the manual recommends adding an optical storage device to your system—with Digital Album, you're going to need one.

ImageAccess 1.0

Nikon's ImageAccess ($495) gives you an attractive black background for viewing thumbnails and also displays a small icon to let you know if the media containing the image you're seeking is mounted or not. And the program offers direct support for Nikon's LS-3510AF 35mm slide scanner via a plug-in module. But you can't open multiple catalogs, and there's no network support. Plus, the program can't read sound, movies, or CMYK TIFF, and previews are slow.

CompassPoint 1.1.1

If you need strict controls that determine who can access what image, you might consider Northpoint Software's CompassPoint ($749). The program is most effective in a multiuser environment, complete with passwords and estimated checkout times—sort of like a library loan program. Like Digital Album, though, the interface is clunky and will slow down administrators and users alike. For its high price tag, CompassPoint should be easier to use and offer more features.

Thumbs Up 1.3

The most problem-ridden program was also the most expensive—Graphic Detail's Thumbs Up ($995). Using Thumbs Up was a stressful, irritating experience. When you first launch the program, it inexplicably beeps at you four times, then emits another five beeps after it displays the credit box. No part of this program is easy or a pleasure to use, and it doesn't offer any features you can't find in a lower-priced program. I wholeheartedly give it a thumbs-down.

Adding It All Up

For most people, Aldus Fetch and Multi-Ad Search are the safest bets; both are relatively easy to use, fast, and flexible. But image databases are still in their infancy, and even Fetch and Search could stand some improvement. Here are some areas where image database programs could—and let's hope, will—improve.

Ease of use Overall, most of the programs are fairly easy to use, but they could be even easier. Keyword synonyms would help: I'd like to be able to type the word *male* and see images with the keyword *man* appear among my choices. A "best guess" spelling checker would also be helpful. And any way to shorten the keyword-entry process—possibly through some selective cut-and-paste or duplicate feature—is sorely needed, especially if you're faced with a catalog of 20,000 images that all need keywords.

Thumbnail customization Programmers should follow Shoebox's lead and give us the ability to fully customize the way in which thumbnails and file information are presented. You should also be able to view a thumbnail of every data file on a system—including text and page-layout files. (This should become a reality as portable document formats, such as Adobe Acrobat, become common.)

Cross-platform capabilities Mac-based designers and photographers are increasingly working in multiplatform environments and should be able to easily share images between Macs and other PCs. Currently none of the programs provide this functionality. ImageAccess, Shoebox, and Digital Album are available on both platforms, but none of the programs can share an image database.

A standard file format Finally, a standard catalog format that would enable you to move catalogs between image-management programs is greatly needed. Currently, the only program that can open another program's files is Multi-Ad Search (it opens and converts Fetch files).

This limitation ties you to one program from the beginning. No one is going to want to spend a lot of time manually entering keywords in one program, only to discover later that there's a better image-database program for his or her needs and that using it means having to retype all those keywords. So until there's a more democratic file exchange between image databases, one thing about this new category of products is perfectly clear: you've got to pick your image database very carefully. **m**

JIM BENSON (formerly Jim Schmal) is a San Diego–based designer, consultant, and writer; he is coauthor of *The Gray Book* (Ventana Press, 1990).

IMAGE DATABASES

MW EDITORS' CHOICE

Macworld looked at 11 image-management programs, ranging in price from $99 to $995, and found 2 overall winners.

Aldus Fetch 1.0 Its inability to open more than one catalog at a time is a significant weakness. Otherwise, Fetch offers extremely versatile file-recognition abilities and a simple, easy-to-use interface at a competitive price. **Company:** Aldus Corporation. **List price:** $295.

Multi-Ad Search 2.0 The fastest at importing, searching, and previewing, Multi-Ad Search is an excellent choice for multiuser environments with lots of images. **Company:** Multi-Ad Services. **List price:** $249.

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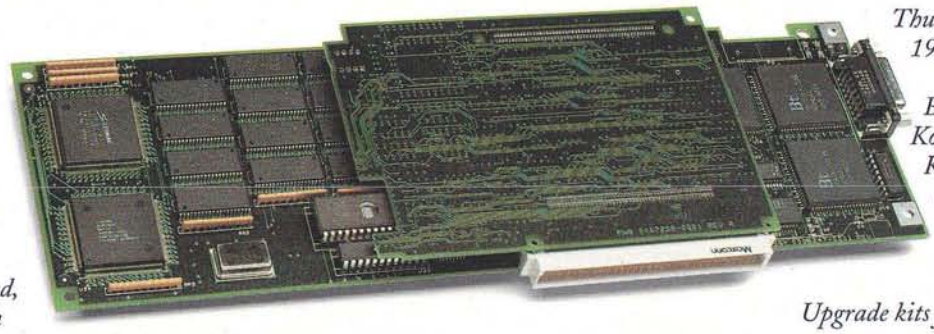

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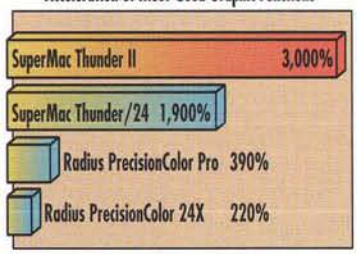

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Circle 88 on reader service card

EDITED BY DAN LITTMAN

At Work

THE LATEST TOOLS FOR BUSINESS COMPUTING

WordPerfect Broadens Appeal

WORDPERFECT CORPORATION IS UPgrading WordPerfect with button bars, ruler bars, and an improved status bar; table- and equation-editors; drag-and-drop text; document preview in the open dialog box; improved compatibility with WordPerfect for DOS and Windows; and support for new Apple System software.

WordPerfect 3.0's new button bar adds one-click access to commands for graphics, equations, and word processing, and users can modify the bar or create custom button bars.

WordPerfect's table-creation macro has been replaced with a full-blown editor that can create tables up to 32 columns across and, WordPerfect says, more than 500,000 rows deep. Raw text can be selected and converted into a table; cells can be joined and split; a table's appearance can be formatted with graphics and word processing tools; and some primitive math functions are available. The equation editor stores mathematical symbols on a floating palette, and the keyboard is remappable, which makes it possible to key in expressions. Though they are created in a draw-like environment, expressions remain completely editable after they are created, and the editor understands how expression fragments are nested in complex expressions.

Version 3.0 supports AppleScript, Apple's application-automation language, which works in conjunction with WordPerfect's own macro language. The new version also supports AOCE (Apple Open Collaboration Environment), with a mail button on the button bar for sending documents without opening an E-mail program. Files, even files containing tables and equations, can be shared with WordPerfect 6.0 for DOS and 5.2 for Windows. WordPerfect 3.0 should ship in October with price unchanged at $495. WordPerfect, 801/225-5000.—D.L.

DON BAKER

Planning to Negotiate

SCIENCE IS REPLACING ART IN NEGOtiating. Beacon Expert Systems designed Negotiator Pro so that people not trained as lawyers can apply the newest negotiating techniques to their own business situations.

Negotiator Pro demands some homework, leading you through questions about the person you plan to negotiate with and the issue you will negotiate. Using an expert system built into its HyperCard shell, Negotiator Pro searches your responses for indications of potential problems; finds questions you haven't thought through; and provides hypertext links to appropriate passages from standard works on negotiating. The program's architect, Harvard law professor Daniel Burnstein, says Negotiator Pro has a win/win slant but can help users deal with hardball opponents as well.

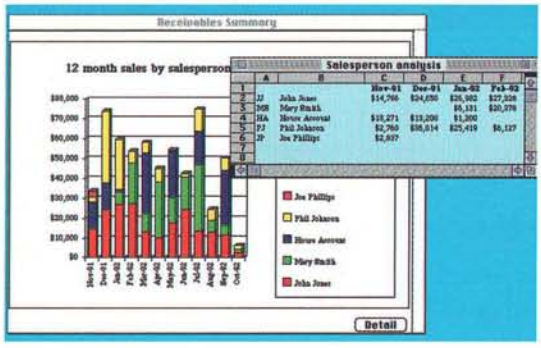
NP version 4 is shipping for $495 and includes five sample files, including real estate leasing and technology licensing. Steep student and academic discounts are available. For $249 Beacon sells specialized versions for negotiating sales and purchases, and next winter Beacon plans to ship a home-user product with modules for selling a house, finding a job, and other common negotiations. Beacon Expert Systems, 617/738-9300.—D.L.

Flexware 7: No Heavy Lifting

AN UPGRADE TO THE HIGH-END programmable accounting system Flexware will make it more appealing as an off-the-shelf product that requires less or no customization, as well as add a good number of features for developers and consultants.

The new version, 7.0, will include client-server technology; the ability to import MacDraw graphics and use them as forms (previous versions could print only on preprinted forms); much-expanded reporting capabilities; and an inventory price matrix that can mix and match discounts based on quantities and customer types. The publisher also promises a less modal interface. Two new modules will be available: FlexExec, for browsing through summary information about the state of your business, and The Tracker, a contact-management and sales-automation system designed for managing a sales force and evaluating your company's sales process.

Flexware 7.0's pricing was not set at press time, but the product should ship this fall. Flexware was recently acquired by DOS accounting software publisher Manzanita Software, 800/447-5700.—D.L.



Flexware's FlexExec module summarizing the performance of a group of salespeople.

Crystal Ball to Run inside Excel

DECISIONEERING IS UPGRADING Crystal Ball to version 3.0 and making it run inside Excel. Previously, the program, which allows you to replace spreadsheet cells' single values with ranges generated to fit probability distributions, was a separate application that required the user to save a SYLK file from Excel, switch to Crystal Ball, and reopen the file (see "Forecasting the Future," *Macworld*, September 1993).

Working from inside Excel, Crystal Ball 3.0 can use cells containing functions that generate changing values while Crystal Ball runs through multiple iterations. The new version can show forecast values in a graph of percentiles, and adds a gamma distribution, a Pareto distribution, a logistic distribution, and a distribution for extreme values. Crystal Ball 3.0 should ship this fall at $295. Decisioneering, 303/292-2291.—D.L.

Kodak Ships Powerful Color Printer

KODAK IS SHIPPING A COLOR PRINTER that provides high-speed hardware and midrange color quality, designed to appeal to office users. The $7999 ColorEase PS has a 40MHz SPARC RISC processor, a PostScript Level 2 interpreter, 16MB of RAM, and a 120MB internal disk for fonts and image caching. It uses thermal-dye technology to deliver 24-bit, 300-dpi, continuous-tone images on letter-size paper and transparencies. The ColorEase PS can accept print jobs over LocalTalk, parallel, and serial ports at the same time (EtherTalk requires a $495 option), and can print one image while processing the next. The printer does not support PCL. The thermal-dye ribbon is good for 100 prints, and replacements are $145. The printer requires special thermal paper and transparency material, which cost $65 and $115, respectively, for 100 sheets. Eastman Kodak, 716/253-0740.—TOM NEGRINO

PHILIP KAAKE

IN BRIEF

■ **FileMaker Expands LAN Support** Both the Mac and Windows versions of FileMaker Pro will soon support Microsoft LAN Manager, Novell NetWare, Novell's MacIPX, Banyan VINES, Artisoft's LANtastic, and other network operating systems. The upgrade, FileMaker Pro 2.1, should ship this summer for $399 from Claris Corporation, 408/727-8227.

■ **ithink Smarter** ithink, a program for modeling business and production processes, will add support for embedding models inside other models in a hierarchy. Other changes in the version 3.0 upgrade include sliders for adjusting an item's parameters without opening the item's icon; conveyer belts with variable process times; and support for time-stamping items as they enter a process. Special documentation on process reengineering will be included when ithink ships this fall for $695. High Performance Systems, 603/643-9636.

■ **Credit Reports Available Online** MacFerret is a specialized telecom package for connecting to TRW, Trans Union, or Equifax to perform consumer credit checks. Users must have accounts at the services to use MacFerret, which costs $199 for a version that can communicate with one service and $349 for a version that can communicate with two or all three services. A later version will support batch-processing and the TRW Business and Dun & Bradstreet services. Software North, 907/561-4412.

■ **FullWrite Resurrected?** Akimbo Systems has taken over marketing the attractive and powerful but ill-starred word processor FullWrite Professional. FullWrite's previous publisher, Ashton-Tate, provided desultory management for the product before being acquired by Borland in 1991. Akimbo says it is developing a major upgrade to the program that will list for $395. 617/776-5500.

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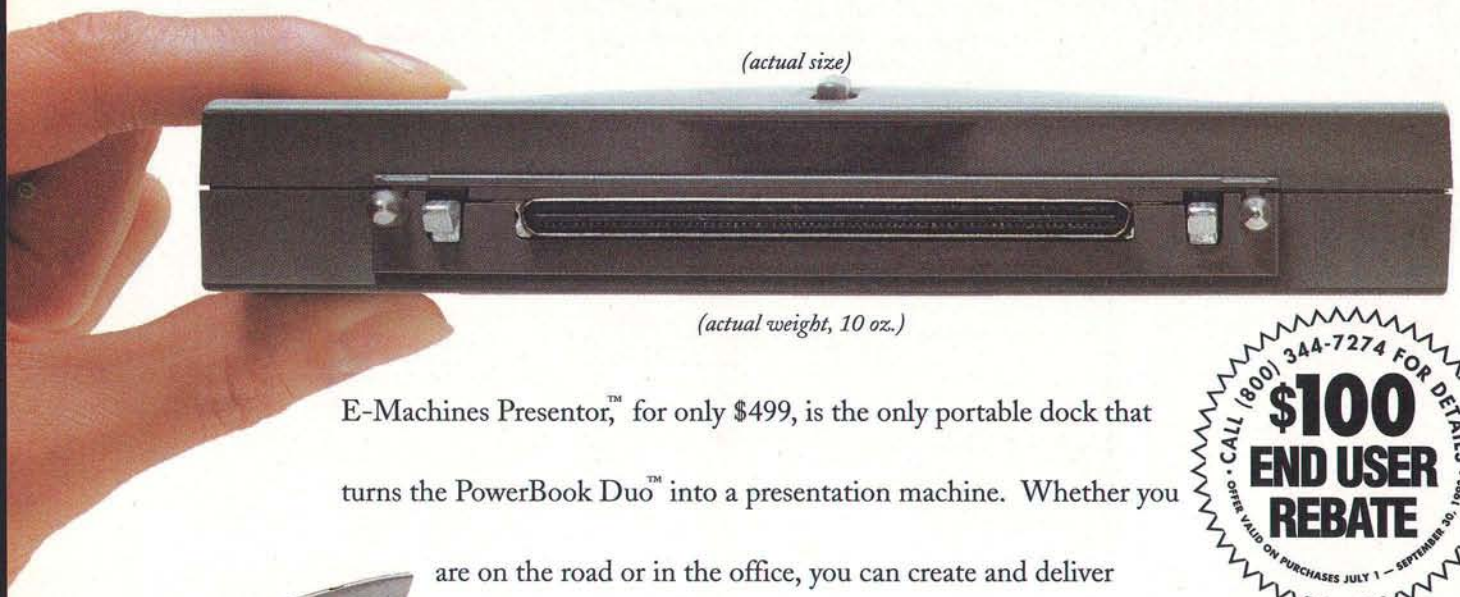

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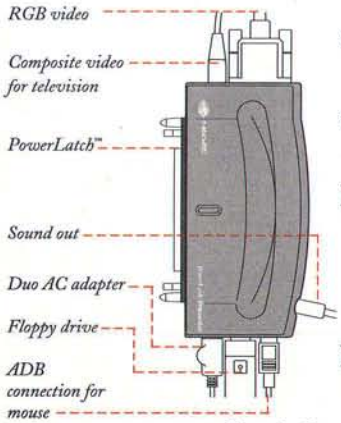

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Circle 136 on reader service card

BY JIM HEID

Working Smart

Power Faxing from Your Mac

CAN YOU IMAGINE BUSINESS LIFE WITHout fax machines? The folks at Federal Express probably fantasize about it, but the rest of us wouldn't dream of doing away with those warbling wonders.

Most of the world relies on desktop fax machines to beam documents about, but those of us with computers have another alternative—the fax modem. (If you have one of Apple's new AV Macs—the Quadra 840AV and Centris 660AV—you already have a fax modem built in. See "The AV Macs," in this issue, for more information.) With a fax modem and a Mac, you've essentially got millions and millions of printers to choose from as your output device. Combine a fax modem with a laser or ink-jet printer, and you have a plain-paper alternative to that cheesy thermal fax paper.

In this month's column, I provide tips for getting higher-quality faxes, reducing fax-transmission times, and taking advantage of the timesaving features most fax modem software provides. I also describe a slick technology that's been slow to catch on: PostScript fax. (For a review of fax modems that run at 9600 bits per second or faster, see "High-Speed Fax Modems," in this issue.)

When a Fax Machine Is Best

There are several tasks better handled by a conventional desktop fax machine than by a Mac and a fax modem.

Sending faxes of hard-copy originals is one task that's ideal for a fax machine. To fax a newspaper clipping with a modem, you need to scan it first; that's a lot of work compared to simply feeding the original into your fax machine.

Fax machines can be preferable when receiving faxes, too. Leaving a Mac on 24 hours a day wastes energy and shortens a hard drive's life. My Canon fax machine, however, uses a mere 10 watts in standby mode—about a night-light's worth. And it's completely silent, at least until an incoming fax makes it sing.

There's another reason I prefer a fax machine for receiving. When a fax modem detects an incoming call, its software jumps into action, temporarily slowing down the Mac (although not significantly so; most fax modem software works in the background). As someone who religiously chooses the Save command, I don't like the idea of my Mac suddenly starting up another task on its own and keeping me from saving my work in progress.

Most fax modem software, by the way, lets you disable automatic answering. For example, with STF Technologies' Faxstf—the basis for the software supplied with most fax modems—open the Chooser, select the FaxPrint icon, and click on Setup. In the subsequent dialog box, select the Fax Modem option and choose Never from the Answer On pop-up menu.

When a Fax Modem Is Best

When is a fax modem preferable to a fax machine? The superior quality, the efficiency of not having to print documents and then feed them into a fax machine, and the convenience features offered by fax software make fax modems a better alternative than desktop fax machines when you're transmitting Mac-generated files.

You're likely to use your fax modem frequently for transmitting business correspondence. That's fine, but how to add your John Hancock to the document?

One way is to digitize your signature with a scanner and save it as a TIFF or PICT file. But if you don't have a scanner, a draw program will do the trick. First, use the Mouse control panel to select the desired mouse-tracking speed, then draw your signature at roughly twice its normal size and save the result as a TIFF or PICT file.

To add your signature to a document, import the image and scale it down to 50 percent (for the best resolution). If you're signing documents created with Microsoft Word or another word processor with a glossary feature, store the signature as a glossary entry and retrieve it with a keystroke or two. Or paste the image into the Mac's Scrapbook; from there you can copy it into any program.

There is yet another option: For $19.95 Signature Software (503/386-3221, 800/925-8840) will digitize your signature; for $99.95, they will create an entire font (in TrueType or Type 1 PostScript formats) based on your handwriting.

Putting Your Best Fax Forward

The first step toward ensuring that faxes look their best is to use TrueType fonts, or Type 1 PostScript fonts with Adobe Type Manager, which result in smooth text at any size—an important plus for printed and faxed documents alike.

As for which fonts to use, keep in mind that type is distorted by the relatively low faxing resolution. It's best to use sturdy fonts that can withstand the rigors of low-res imaging—Adobe's ITC Stone Informal is a good choice, as is Adobe's Lucida font.

continues

Standard fax resolution is 200 horizontal dots per inch by 100 vertical dpi. If you're faxing documents formatted for wide orientation (for example, 11 by 8½ inches instead of 8½ by 11), those figures reverse—horizontal resolution is only 100 dpi. For this reason, you get better quality if you fax horizontally oriented documents in fine mode, which provides 200-by-200-dpi resolution. (This applies to conventional fax machines, too.) Keep in mind, though, that doubling horizontal resolution slows faxing times.

Should you want to include artwork in a fax—an illustration, say, or simply an electronic letterhead with a company logo—don't use encapsulated PostScript (EPS) artwork. Unless installed in a PostScript printer, a fax modem is a QuickDraw-based device—it relies on the Mac's built-in graphics routines for imaging text and graphics. When you fax an EPS image, it's transmitted at a chunky 72 dpi versus a fax's 200-dpi resolution. The solution: import EPS art into a QuickDraw-oriented draw program, such as MacDraw, then save the art as a PICT file. Finally, import the PICT image into the document you're faxing.

If you have a PostScript software emulator, such as Freedom of Press Classic 4.0, you can fax EPS art by going through a two-step process: (1) configure Freedom of Press to send its output to a PICT file instead of a printer, and (2) fax the resulting PICT file. For details on PostScript emulators, see "Maximize Your Printer," *Macworld*, September 1993.

Saving Time: Gray Matters

There are several ways you can speed the process of faxing with a modem. One trick is to avoid extensive areas of gray shading in a document. When you transmit a fax, the fax software compresses the page image by replacing groups of contiguous white or black pixels with a code. Gray shades, which are made up of alternating black and white dots, can't be efficiently compressed.

Another way to save time when faxing is to nix the cover page by placing the to-and-from information at the top of the first page or in a header or footer. If you don't want to besmirch your pages with address information, consider using a short cover page. Faxstf provides a half-page cover sheet as well as one called QuickFax that's just 6 inches long.

If you don't use Faxstf, you can create a short cover page of your own with the cover-page customizing software all fax programs include. Even if the receiving fax is a sheetfed machine (which uses the same size sheet of paper no matter how short the original is), the shorter cover page will takes less time to transmit.

Consider using the quick-faxing desk accessory many fax programs include when you just want to send a quick note ("The express package arrived safely—thanks."). Desk accessories such as Faxstf's QuickFax let you peck out a few lines and beam your message on its way—but they don't let you save your miniature missives. To retain a record of what you sent ("I faxed a counteroffer at noon—didn't you get it?!"), use a word processor and desktop fax machine.

Saving Time: By the Book

The phone book feature all fax software provides is a big time-saver. It allows you to enter and save address and phone information for the people you regularly fax. If you already store names and numbers using a contact database or other address book software, you can import the existing data into your fax phone book—if your fax software supports it. The software that accompanies Apple's PowerBook fax modems doesn't. Cypress Research Corporation's FaxPro II 2.2 and

*Suggested U.S. list price. †In Canada, call 1-800-387-3867, Ext. 7563. Adobe and PostScript are trademarks of Adobe Systems Inc. which may be registered in certain jurisdictions. ©1993 Hewlett-Packard Company PE12360

Looks like another LaserJet breakthrough for Macintosh.

- It's the breakthrough you've been waiting for: the HP LaserJet 4ML. The most affordable LaserJet printer ever made for Macintosh.
- HP's LaserJet 4ML printer has been engineered for the Mac from the ground up.
- Easy setup means you just remove the 4ML from the box, load the drivers, and you're ready to roll.
- A RISC processor, identical to the one found in the LaserJet 4M, and built-in genuine PostScript™ Level 2 software from Adobe™ kick your work out fast.
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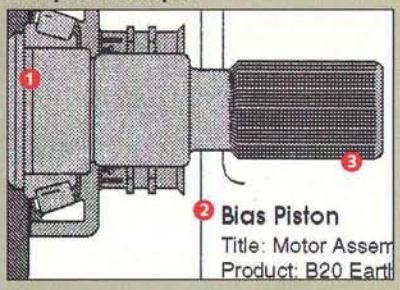
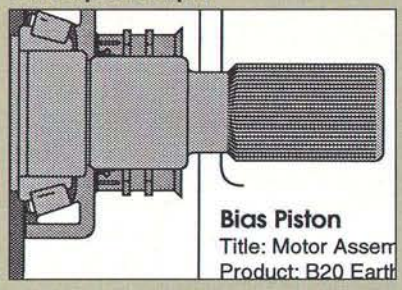
Fax Quality: PostScript versus Standard

Group III fax output



PostScript fax output



PostScript fax modems are really PostScript printers with a special fax-modem board that can send files to other PostScript fax modems or to standard Group III fax machines.

This technical illustration shows the difference between standard Group III output (left) and the same image sent between PostScript fax machines (right). Compare the Group III output's mottled gray screen **(1)** and coarse type **(2)** to the PostScript sample. Note also the irregular distance between the closely spaced lines **(3)** on the Group III output.

CommForce's 4-Sight can import a standard tab-delimited text file—a data-exchange format most databases and spreadsheets can create. Faxstf includes a crude utility that can import (and export) tab-delimited files. This essential capability is being rolled into a future release of the program. And Global Village Communication's Global Fax software (included with Global Village modems but not sold separately) can read databases directly from many popular address book programs, including Address Book Plus, Dynodex, and TouchBase.

Most fax programs provide advanced addressing options, such as support for *groups*—collections of multiple addresses. Those who frequently send the same fax to several locations can automate the process by creating a group. Many programs also let you defer faxing until a specified time—such as after 11 p.m., when phone rates drop. Combine deferred faxing with group faxing, and your Mac can send a flock of faxes while you sleep.

When using a long-distance carrier that requires an access code (such as MCI's 950-1022), remember to type the code before faxing long-distance. If you have a phone calling-card number, you can enter it in Faxstf's Macro Dial String box. (Select FaxPrint in the Chooser, click on Setup, then click on the Fax Software option.) Thereafter, you can add those digits to the number Faxstf dials by simply typing **M**.

Finally, if you're on the road with a PowerBook, fine-tune your phone book ahead of time to remove prefix characters (such as a 9 followed by a comma—the sequence often used to access an outside phone line from an office) or add long-distance access codes. Here's an area where Apple's and Global Village's software have an edge over Faxstf. Rather than forcing you to add a prefix to every phone number (as does Faxstf), Apple's Fax dialog box provides a Dial Prefix text box where the prefix is stored. When you are out of the office and do not need the prefix, simply delete it from this box.

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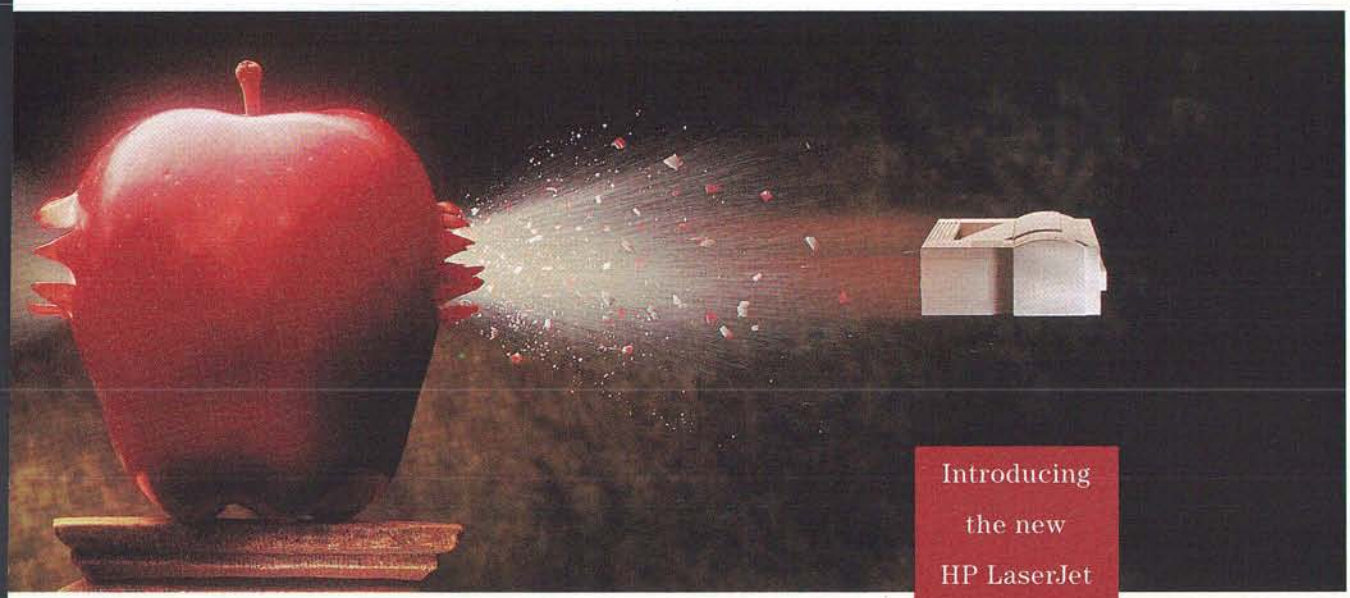

- Thanks to HP's Resolution Enhancement technology and microfine toner, the LaserJet 4ML delivers the finest 300-dpi print quality available.
- The 35 built-in PostScript Type 1 typefaces let you give any document a distinctive and personal touch.
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- But perhaps the most remarkable feature of all is the price–only $1,279.* To learn more, call 1-800-LASERJET, Ext. 7563.† You'll see that with the HP LaserJet 4ML, you can't miss.

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MacUser 6/93

Backup Your Files Easily & Reliably with FileDuo

FileDuo is an easy-to-use backup program that performs unattended backups to any mountable volume. No need to create complicated macros to automate a backup with FileDuo. It's just a matter of clicking a few buttons. FileDuo watches the clock and creates backup files as often as you specify: at shut down or at a certain time. Unlike other complicated backup programs, FileDuo backup files need no restoration — they are an exact duplicate of the original. Options include backup of modified-only files, generational copies, backup log file, and more...

FileGuard

Rated 5 Mice! MacUser 4/91

From the same publishers of FileGuard® security software, rated 5 mice from MacUser.

Call us for more detailed info on FileDuo, & other "Watchdogs" for the Macintosh.

"Watchdogs" for the Macintosh

ASD software, inc.

4650 Arrow Highway, Ste. E-6
Montclair, CA 91763
AppleLink: ASD
Fax: (909) 624-9574
Phone: (909) 624-2594

Circle 170 on reader service card

How to Handle Incoming Faxes

When you receive a short fax that you just want to read and don't need to print, use your fax software's viewing feature to zoom the page image to 200 percent for increased legibility. If you do want to print a received fax, you'll see your output more quickly if you send it to a QuickDraw-based printer, such as Hewlett-Packard's DeskWriter or Apple's LaserWriter Select 300, than a PostScript printer.

Some fax programs, such as Global Village's Global Fax, offer OCR options that can turn faxed text into editable text. You'll get the most accurate results with fine-mode faxes containing 12-point or larger text. Even then, don't expect anything near 100 percent accuracy.

If you receive a lot of faxes you'll need a fair amount of disk space for storage. When you're finished with a received fax, delete it, or do an occasional purge of the fax folder, printing faxes you want to keep or copying them to floppies.

The Facts on PostScript Fax

NEC Technologies and Compaq Computer Corporation offer optional fax modems for their PostScript printers. The fax modem board turns the printer into a plain-paper fax that can receive faxes even as it handles incoming print jobs. Software is included that also lets you send faxes from a Macintosh or DOS PC.

The marriage of a PostScript printer and a fax modem is a happy one. For one thing, you can send and receive PostScript artwork and get recognizable results—none of that 72-dpi QuickDraw business. You get even better results if you have a PostScript fax at both ends of the line. In this case, the receiving printer prints the document at the printer's maximum resolution—800 dpi for Compaq's Pagemarq printers, 300 dpi for the NEC SilentWriter Model 95. The received fax looks as if you printed it from a Mac on your own network (see "Fax Quality: PostScript versus Standard").

Adobe says more printers that support fax options will appear within the next year. Later, expect to see color PostScript printers offering faxing options.

Tips for the Frequent Faxer

For fax-happy offices, consider setting up a network fax server instead of giving each Mac a fax modem. Network fax systems, such as Cypress Research's FaxPro II and CommForce's 4-Sight, let you set aside a modem-equipped Mac for your network's faxing needs. With a fax server, the Macs on your network are free from the grunt work of receiving faxes and converting documents for faxing.

FaxPro II also lets you create a database of the documents you fax frequently. A document in a fax database has already been converted into faxable form; when you need to fax the converted document, you simply tell the server to do it.

Claris uses FaxPro II for its automated fax-back system, which lets you order technical notes and other information by pressing a few keys on your telephone. 4-Sight offers a similar feature, but the program's real strength is its tight link to the Microsoft Mail and CE Software QuickMail E-mail systems. (CommForce is jointly owned by CE Software and 4-Sight Systems, a British company.) With 4-Sight, you can send faxes using the same desk accessory you use to send E-mail. Fax numbers are stored in the E-mail system's address book. **m**

Next Month: Special-Purpose Word Processing

WHERE TO BUY

CommForce 4-Sight Ten-user, single-line version $795; up to $24,995 for an eight-line version that supports an unlimited number of users. CommForce; 515/224-0211; no fax.

Compaq Pagemarq 15 With fax board $2869; **Compaq Pagemarq 20** with fax board $3979; optional 60MB internal hard drive (recommended for best performance) is $439 for either printer. Compaq Computer Corporation; 800/888-5858; no fax.

FaxPro II 2.2 Software $550; with single-user modem $850; with network modem $999. Cypress Research Corporation; 408/752-2700; fax 408/752-2735.

Faxstf 2.2.3 $89; STF Technologies; 816/463-2021; fax 816/463-7958. Distributed by Telefocus; 816/886-9800.

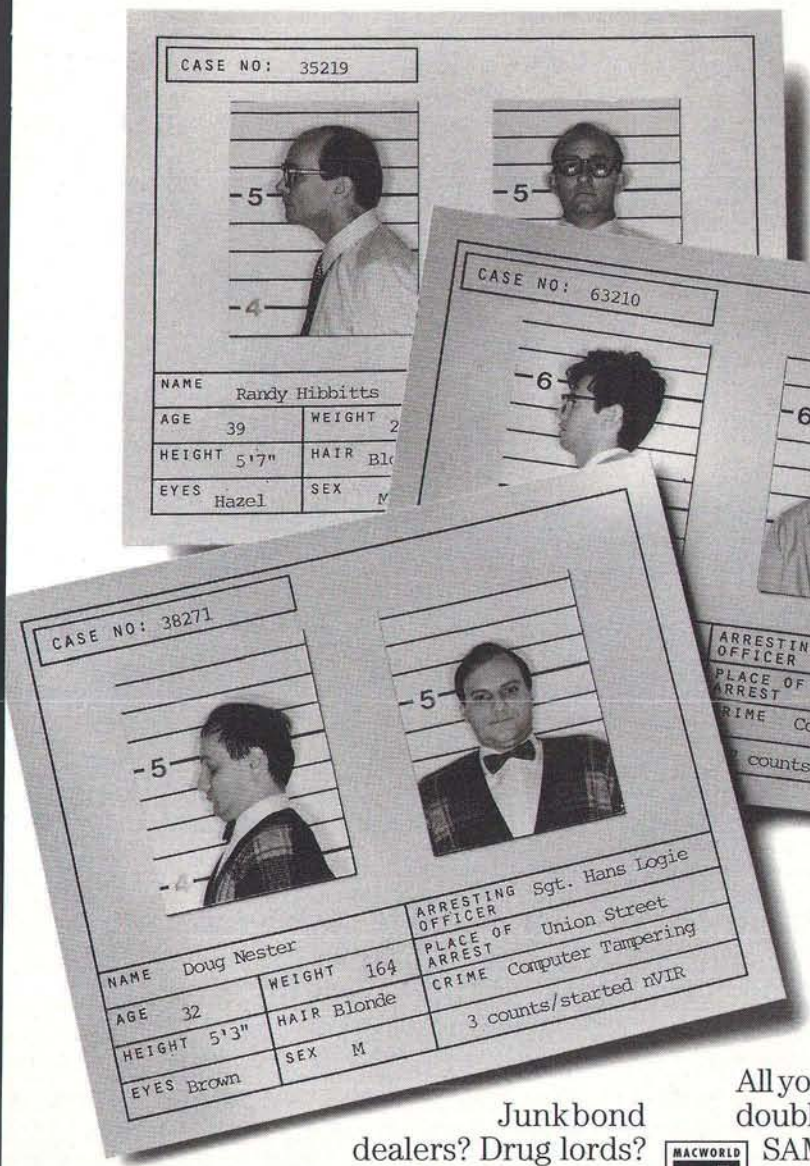
Freedom of Press Classic 4.0 $149; ColorAge; 508/667-8585, 800/437-3336; fax 508/667-8821.

ITC Stone Informal $275; **Lucida** $185; Adobe Systems; 415/961-4400, 800/833-6687; fax 415/961-3769.

NEC SilentWriter 95 $1749; PostScript Fax option $599; NEC Technologies; 508/264-8000, 800/388-8888; no fax.

Contributing editor JIM HEID has been writing about the Mac since its introduction. His latest book, *Macworld Complete Mac Handbook+CD,* has just been published by IDG Books Worldwide.

WE OFFER THE MOST PROTECTION FROM RUTHLESS CRIMINALS LIKE THESE.



Junk bond dealers? Drug lords? Savings and Loan presidents?

Nope, they're computer hackers. And judging by their physical appearance, you wouldn't think you'd need any protection from them. But you do. Or should we say, your computer does.

And to keep these criminally minded people from infecting your files, floppies and various software programs, you need SAM 3.5 anti-virus software.

You see, SAM will constantly monitor for 14 suspicious viral activities. Which is more than any other anti-virus program on the market. And it's the only program that will scan compressed files in System 6.0 and 7.0.

So basically, if your Mac has a virus, SAM will detect it, get rid of it and repair the file. And if your Mac is virus-free, SAM will help to make sure it stays that way. Because it monitors your Mac transparently, working behind the scenes, and only interrupting when a virus is found.

What's more, SAM is simple to install on a Macintosh networking* system, as well as a single-user Mac. All you need to do is load the program disk, double-click on the Installer Icon and let SAM handle the rest.

For the most anti-viral protection, pick up SAM 3.5 at your local retailer. It's the most popular anti-virus program in the world, and will keep you from ever having to deal with this ugly crime. Or these ugly criminals.

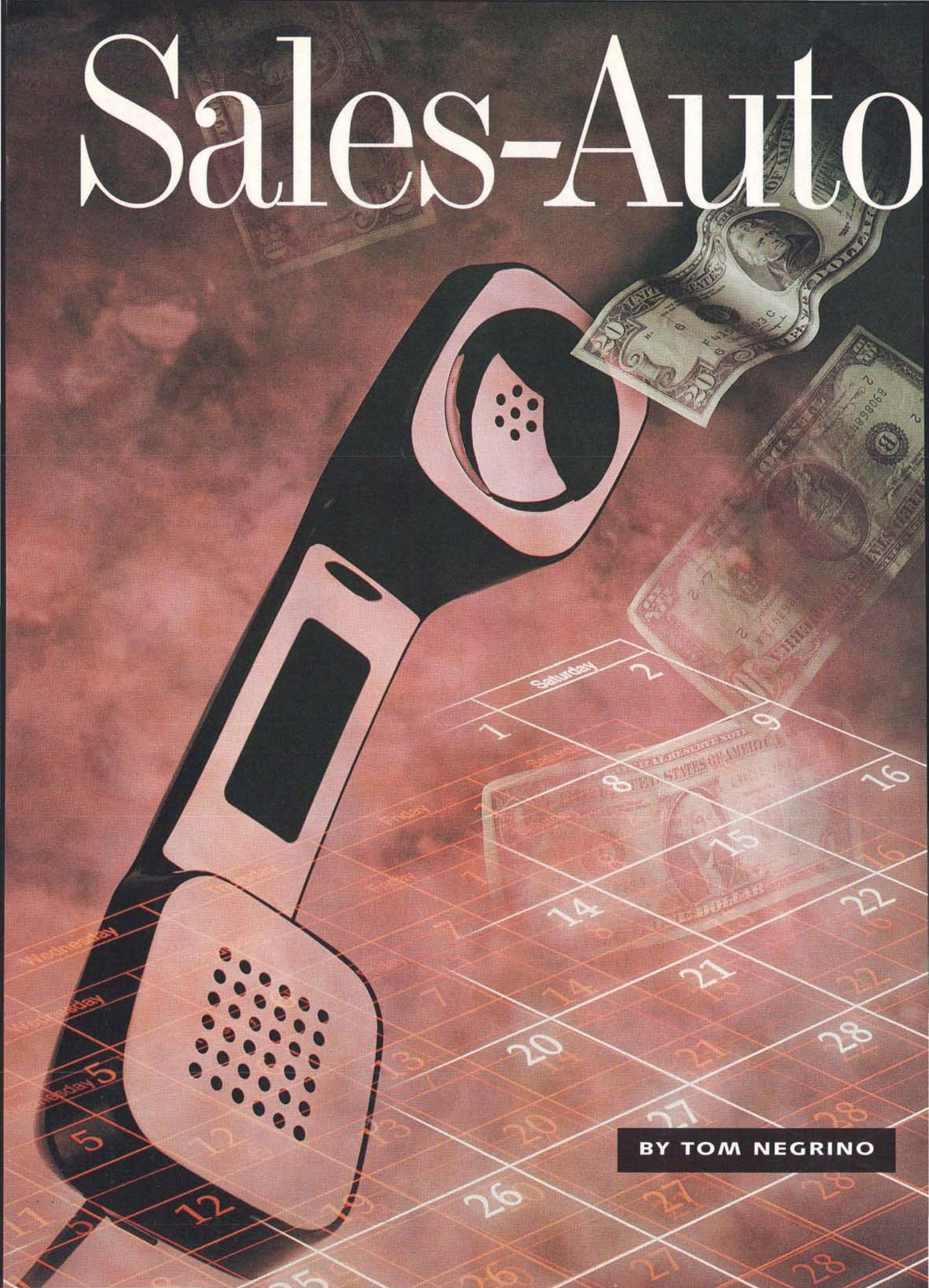
MACWORLD 1993 World Class Award Winner

Winner of the 1993 MacWorld World Class Award.

SAM™
Symantec AntiVirus for Macintosh
SYMANTEC.

SAM is a registered trademark of Symantec Corporation. All other names are trademarks of their respective holders. In Canada, call 1-800-667-8661. Everywhere else, call 408-252-3570. *Available for volume purchasers, and with the SAM 10-pack version. Call 1-800-554-4403. Select option #1 and request document #621. To upgrade to SAM 3.5 for $24, call 1-800-343-4714 ext. AR59. Offer price in U.S. dollars. Valid in U.S. and Canada only. ©1993 Symantec Corporation. All rights reserved.

Sales-Auto



BY TOM NEGRINO

mation Software

FROM COLD CALLS TO HOT DEALS, THESE PROGRAMS CAN BOOST YOUR BOTTOM LINE

If you sell for a living, you know it's no picnic. Successful selling is a process that has many steps: capturing the initial lead, learning about the prospect's needs, making a sales presentation, submitting and refining a bid, and finally closing the sale—and then following up with your new customer to build a relationship for future sales. Each step can involve meetings, phone calls, and letters, and it's not unusual for a salesperson to have dozens or hundreds of leads and customers in various stages of the sales process. Sometimes it's next to impossible to keep up with the stacks of paperwork, phone calls, and meetings needed to shepherd each lead along the road to a sale. That's where sales-automation software comes in.

Sales-automation software integrates features from address book managers, calendar programs, word processors, and other standard business tools. More important, it automates your work—by automatically scheduling a follow-up call when you send a letter to a client, for example. Some programs support sales plans, which are highly structured strategies that you customize for your particular business. A sales plan spells out every step of the sales process and directs you or your sales staff to perform certain tasks based on the outcome of the previous step (see "Planning Ahead to Sell More Effectively").

For this article I evaluated eight products: Breakthrough Productions' Market Master 3.5; Chang Labs' CAT IV 1.0; Colleague Business Software's CBS 3.2; Diamante Software's Control Classic 1.5.4; version 2.5 of EndPoint Marketing Information Systems' family of three Leads products, Corporate, Manager, and Personal; Remote Control International's TeleMagic version 12; Symantec Corporation's ACT 1.01; and WestWare's Contact Ease 2.0.1. I looked for products that will help you make more money, not just get organized for organization's sake; with good software you'll spend more time working with clients instead of with a computer.

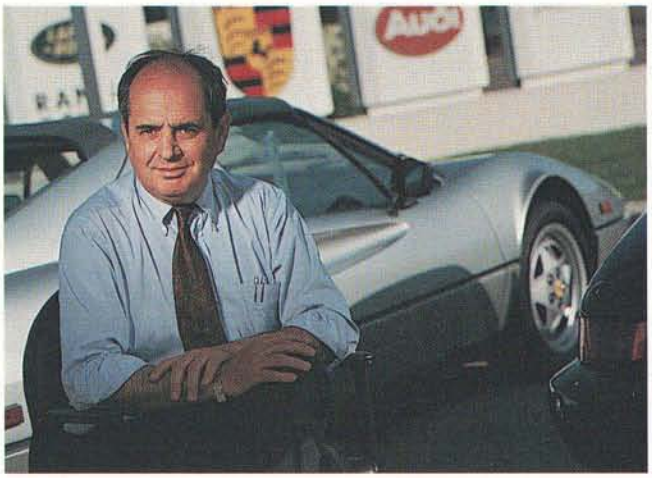
Tracking Your Contacts

Good customer tracking requires keeping a database of information about your clients, with a detailed contact history. Contact Ease provides the best mechanism for recording client histories. It automatically updates the client history file when you send a letter, take a phone call, or meet with a client, and there is plenty of room for activity notes. CBS enables you to create associates—people related to a client, such as a client's employees—to avoid entering duplicate information, such as the company address, for each person (see "Integrated Sales System"). CBS can also post events such as birthdays and anniversaries on its calendar.

CAT IV provides tracking by letting you retrieve every document related to a contact with a few mouse-clicks. ACT provides only limited tracking features, with room for one line of notes on an activity, but it does allow you to customize the database extensively: virtually every field can be relabeled to your liking. Contact Ease, Control Classic, TeleMagic, and CBS also have customizable fields and check boxes.

Scheduling Events

Scheduling appointments and to-do items is vital if you meet customers in the field, useful in the office, and almost immaterial for telemarketing. Curiously, most of the programs lack strong scheduling features. CBS and ACT are the two best, with built-in calendars that let you link appointments to clients, schedule appointment length, and mark events as complete. TeleMagic and CAT IV have simple calendars that let you enter appointments but that are not linked to client histories. For the best scheduler, the prize goes to ACT.



GARY MOSS

Michael Huidobro of Cutter Motors in Santa Barbara, California, uses Market Master to help sell Jaguars, Rolls-Royces, Porsches, and other elegant cars.

Structuring Your Sales Process

Control Classic, Contact Ease, and Market Master implement sales plans, but Control Classic's sales plans miss the boat on automation. For example, there is no true branching when a task is complete, so when you make a call, the program doesn't prompt you for the results and then start you on the next step. It only permits you to wait for a number of days before going to the next task, which requires manual intervention and defeats the entire idea of sales automation.

Market Master provides for one plan of unlimited length, and all leads are assigned to that plan. If you don't want a lead to advance along the plan, you must assign it to an inactive plan step. You can, however, branch to any part of your plan from any step (see "Routine Sales"). When it comes to sales plans, Market Master's features are good, but Contact Ease is more flexible. You can have any number of plans, and you can even branch between plans (see "Salesperson's In-Box"). At each step, Market Master allows only three possible results, while Contact Ease allows for five and lets you have contacts that are not on any plan.

Getting the Word Out

Managing your correspondence can be the key to automating the sales process. In this area the edge goes to both Contact Ease and Market Master because their sales plans always generate the appropriate letter for how far along the sales plan you've moved your customer. During the day, you record your work, and at quitting time, the programs know which letters to print and whom to send them to. The big plus to this approach is that an assistant can print letters and stuff envelopes while you're selling.

These two programs are tops at generating letters, but unfortunately, neither has a strong word processor. In fact, Market Master is limited to one-page letters in 12-point Times type. It does support mail merge with Microsoft Word, but I'd rather see a decent word processor in the program. Control Classic, the Leads family, and CBS all use a very good word processor, licensed from Metropolis Software, that supports multiple pages and headers and footers, and provides extensive formatting control. TeleMagic's word processor is extremely simple, little more than a bare-bones text editor. CAT IV's word processor lets you include merge fields and calculations in your documents, making it the most flexible word processor of the lot, and ACT's word processor has the most complete feature set, including a spelling checker and a macro recorder.

Special Features and Special Problems

Some programs have unique features that appeal only to certain users, and others have disadvantages that may rule them out for you.

CBS is the only program I looked at that has extensive accounting features (TeleMagic also has an add-on accounting module available from a third party). It includes a checkbook, which handles multiple checking accounts and prints checks; and it comes with general ledger, inventory, and invoice modules. CBS can create line-item bids and turn them into invoices when the bid is accepted. The program also has a good selection of financial reports.

Chang Labs' CAT IV automates your whole paperwork process through the use of templates and documents. Templates, which are analogous to database layouts, are

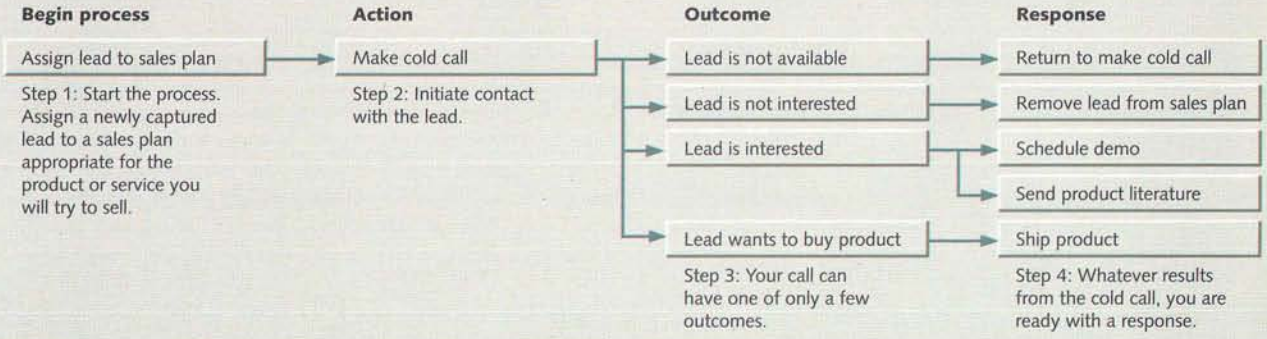
Sales Automation at a Glance

Product	Company	Price (single user/ multiuser)	Accounting	Automated Sales Plans	Scheduler	Database Engine	Word Processor	Phone	Toll-Free Phone
ACT 1.01	Symantec Corporation	$249/NA	○	○	●	proprietary	●	408/252-3570	800/365-0606
CAT IV 1.0	Chang Labs	$495/NA	○	○	●	proprietary	●	408/727-8096	○
CBS 3.2	Colleague Business Software	$495/$175 per user	●	○	●	4D	●	512/345-9964	800/926-9965
Contact Ease 2.0.1	WestWare	$395/5 users $1495	○	●	○[1]	Inside Out II	●	619/660-0356	800/869-0871
Control Classic 1.5.4	Diamante Software	$425/$99 per user	○	○[2]	●	4D	●	214/661-3855	○
Leads Corporate 2.5	EndPoint	$1795/3 users $5495	○	○	○	4D	●	408/737-3831	800/488-5322
Leads Manager 2.5	EndPoint	$995/NA[3]	○	○	○	4D	●	408/737-3831	800/488-5322
Leads Personal 2.5	EndPoint	$595/NA[3]	○	○	○	4D	●	408/737-3831	800/488-5322
Market Master 3.5	Breakthrough Productions	$395/$495 for 4 additional users	○	●	○	Double Helix	●[4]	916/265-0911	○
TeleMagic 12	Remote Control International	$495/$995 for 3 additional users	●[5]	○	●	FoxBase	●[4]	619/431-4000	800/992-9952

● = yes; ○ = no; NA = not applicable. [1] Has to-do list. [2] Partial implementation. [3] Only Corporate provides multiuser support. [4] Simple text editor. [5] Third-party add-on.

Planning Ahead to Sell More Effectively

A sales plan keeps your sales staff on the right path through your company's sales process. To create a sales plan, you must analyze each step involved in selling your product and identify all possible outcomes for each step. Then you need to plan a response for every outcome. Some software products (see the "Structuring Your Sales Process" section in story) let you build in your company's selling process; once set up, they move automatically from step to step. Designing a sales plan is actually easier than it sounds, and analyzing your sales process will help you sell more effectively. The flowchart below diagrams a simple sales plan.



forms such as follow-up letters, appointment logs, or whatever you create with CAT's design tools. Documents—specific letters or other output created with a template—act like records in a database; each is linked to a contact (see "Template-Based Automation"). The link between documents and contacts makes CAT very versatile when searching for and tracking client contacts, and you can create templates for call logs, invoices, labels, or virtually any kind of columnar report, though creating the right templates for your business will take some time. (You may be able to get by with the bundled templates, or you can buy sets for real estate, construction, financial planning, insurance, and other industries.) In short, CAT IV provides more flexibility than any of the other programs I looked at.

Previous versions of CAT were very hard to learn, but CAT IV's improved interface lets you get your bearings quickly. The user manual, on the other hand, still needs more work to be readily understandable to normal human beings.

Remote Control International's TeleMagic, which is written in FoxBase/Mac, is intended for telemarketers and has extensive autodialing and call-logging features. When you make or receive a call, TeleMagic times the call and adds a record to the client history, with date, time, duration, your notes on what happened, and any other information that you enter. You can also store to-do lists and sales goals, as well as telephone scripts (sales pitches for a telemarketing rep to use).

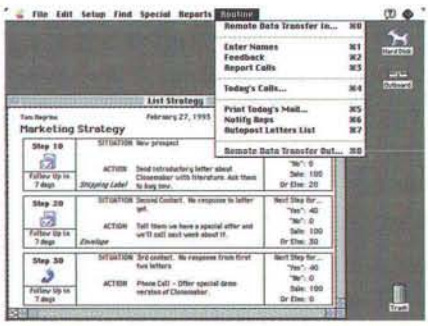
Diamante Software's Control Classic suffers from a cluttered user interface that makes the program difficult to use. In just one screen (Modifying Customers), the program uses a palette of 16 little icon buttons, 2 other buttons, 1 scrolling field, 9 pop-up menus, 2 check boxes, and 24 entry fields. Imagine running that on a PowerBook.

Control Classic's manual also leaves a lot to be desired. In fact, it's simply terrible, going into long and tedious detail on how to search the database, import records, and create and print reports *before* explaining how to create a new customer record. Given the other good choices, it doesn't make much sense to me to wade through Control Classic's bad documentation and confounding interface.

ACT also has a problematic interface. Virtually every task is accessed through modal windows—windows that require an action, such as clicking on an OK button, before you can do anything else. This makes the program harder than necessary to use, and it interferes with your ability to do what you want when you want to do it.

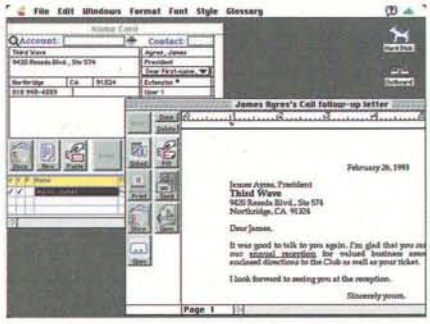
Performance was an issue with some of the programs. CBS, Control Classic, and the

Integrated Sales System The CBS Client Entry shows several associates listed for one client. Note the AP and GL menus for accounting functions.



Routine Sales Here's a sales plan with several branching steps. Market Master's Routine menu lets you work your way down from the top to the bottom during the course of a day.

Salesperson's In-Box This lead is at the beginning of the automated sales plan (in the field Plan Step, the current step is First Cold Call). Contact Ease shows the next possible steps of the sales plan at the bottom of the screen.



Template-Based Automation A mail merge document is attached to a contact. This letter was created by opening the client's Name Card, clicking on the New Document button, and choosing the Call Follow-Up template.

SOFTWARE ALTERNATIVES

Here is a roundup of other products that have some sales-automation capabilities but are not within the scope of this article.

ClienTrac Whiskey Hill Software (415/851-8702). HyperCard-based PIM with lead histories, scripts for telemarketers, and simple sales plans. Easy to use and inexpensive. $135.

Office Manager White Crow Software (802/658-1270). HyperCard stack with job file for tracking work done on an hourly or project basis. Clean interface, easy to learn and use, but lacks depth. $99.

Real Estate Edge Transoft (805/963-7181). Real estate sales tool. Can connect to the Damar and DataQuick real estate online services. $395.

SalesBase After Hours Software (818/780-2220). Comes in two parts: a 4D front end meant for PowerBooks and a Sybase or Oracle back end. Can cost $100,000 or more.

SoftSell Business Software (408/736-3000). HyperCard-based sales-contact manager. Easy to use but lacks depth. Minimal reporting capabilities. Good manual. $290.

SuperOffice SuperOffice Corporation (617/275-2140). Calendar, to-do list, and standard contact-management features. More of a PIM than a sales-automation tool. One user $395, five users $1295, ten users $1995.

three Leads products are written in ACI US's 4th Dimension database, and they were the slowest of the lot, sometimes taking as long as five seconds to change screens when moving from one function to another. Market Master is written in Helix Technologies' Double Helix, and was no speed demon, either. I had no performance problems with the other programs.

Away from Home

For field reps or satellite offices that are supported by the home office, the ability to exchange information with the central database is critical. All of the programs except ACT support this (TeleMagic requires a third-party add-on, and ACT 1.1, announced but not shipping at press time, adds this feature). The Leads family, Contact Ease, and Market Master offer the strongest capability. All three programs' remote features work well. They assume a hierarchical sales organization and can transfer information up or down the hierarchy—from the field staff to the managers, or from the managers to the sales force. The home office integrates information from sales reps, prints and mails the reps' letters, and sends updated contact records and client histories to the reps.

Market Master Remote, a stripped-down version of Market Master, supports a two-level organization, with a home office and multiple field reps. One drawback to Market Master's remote updating is that you must swap three files back and forth; with Leads Personal and Contact Ease you swap only one file.

The Leads family supports a home office with Leads Corporate, and provides Leads Manager and Leads Personal for two levels of field reps. Information can travel up and down all three levels. Leads Corporate can produce extensive management reports such as lead sources, cost per lead, lead follow-up, and lead demographics, among others.

Contact Ease's CyberSwap remote updating feature is the easiest to set up and use, and the most flexible. Contact Ease can handle multiple levels of sales reps, and sales managers can specify at what level in the hierarchy letters to customers are gathered and printed.

Disk space and RAM are at a premium on a PowerBook, and most of these programs leave a pretty big footprint. With the program and a database of 1000 contacts, ACT and CBS take up 6.5MB of disk space, followed closely by Control Classic. Market Master and TeleMagic both require a bit more than 4MB, while Leads Corporate requires 3.2MB (Leads Personal is at 2.1MB), and Contact Ease comes in right under 3MB. And at a mere 1MB of storage, CAT IV is the most space-friendly. The three 4th Dimension programs (the Leads family, CBS, and Control Classic) are the most RAM-hungry, requesting more than 3MB to run comfortably.

Choosing Your Sales Assistant

The wide variety of sales-automation programs means there is one to fit your needs. If you do virtually all of your selling on the phone, TeleMagic is designed with you in mind.

The Leads family is best for intensive lead tracking and reporting in hierarchical organizations that need to pass lead data up and down the line. Equipping your company with Leads will cost more than with the other packages, so check out End-Point's demo disk before you take the plunge. If your business is so idiosyncratic that off-the-shelf packages don't fit, CAT IV accommodates a level of customization that the other programs don't. CBS is a good bet if you're looking for an all-in-one package that can integrate accounting with other aspects of your business. ACT has strong contact-manager features, but it is light on automation and has a confining user interface.

The most automation is provided by Market Master and Contact Ease, the two programs with comprehensive sales-plan support. Both programs work hard to minimize the amount of data maintenance you need to do. If you're a small shop and your main mode of customer contact is simple letters and sales literature, I'd give the nod to Market Master, though Contact Ease is the better choice for multiuser sites.

In the end, more sales and higher commissions are what you want from sales-automation software, and no program can substitute for your sales savvy. Knowing when to ask for the order and close the deal is still up to you. If a sales-automation program lets you ask for the sale more often, it's done its job. **m**

Macworld contributing editor TOM NEGRINO has sold everything from vacuum cleaners (when he was very young) to Macs, vertical-market software, and consulting services.

SALES-AUTOMATION SOFTWARE

MW EDITORS' CHOICE

Of the eight sales-automation tools we looked at in this article, two programs have qualities that make them especially useful and versatile.

Contact Ease Contact Ease strikes a good balance between ease of use, power, and well-thought-out automation. It is accessible to beginners and has strong mail merge and sales-plan features. Larger organizations will appreciate the multiuser and remote updating features. **Company:** WestWare. **List price:** One user $395; five users $1495.

CBS From client management to scheduling to invoicing, CBS covers the territory. With its general accounting features, CBS may be the only software you need to run a sales-based business. **Company:** Colleague Business Software. **List price:** $495.

AT WORK

BY LON POOLE

Quick Tips

Tips, Tricks, and Shortcuts

YOU DON'T HAVE TO READ ABOUT razorback frogs and piqued gymnasts when you open a TrueType or bitmapped font file with System 7's Finder. Use a resource editor such as Apple's ResEdit (from APDA, 800/282-2732 in the United States, 800/637-0029 in Canada, 716/871-6555 in other countries) to edit the sample text in Finder 7.1's resource STR# 14516 as described in May's *Quick Tips*. You won't find that resource in Finder 7.0, however, notes Franklin Harrington of Victorville, California. In Finder 7.0 you'll find the sample text in resource STR 14512. (Note that STR# and STR are two different types of resources.)

Irksome Caddies

Q. I am sure I am one of the many CD-ROM users who find the standard-issue CD caddy an utter nuisance. When placing the silver disc ever so delicately into the flimsy plastic tray—which is harder to open than a typical CD jewel box—I sometimes drop the disc onto my lap (or worse, my dusty carpet). Why must most CD-ROM drives on the market today (including the otherwise excellent unit factory-installed in my Mac IIvx) involve this most awkward contraption, when so many of us have been slipping CDs into our audio players with ease for so long?

While I am whining, I may as well ask why CD-ROM drives are so much slower than magnetic media devices.

Charles Weng
Santa Ana, California

A. If you kept each of your frequently used CD-ROMs in its own caddy, you would handle the caddies instead of the discs inside them. This way the caddies would do their intended jobs, protecting the discs from the vagaries of human contact. Caddies are not terribly expensive; Apple sells a box of five for $39 (part number M2705).

Caddies may seem overkill, but they are one of several ways CD-ROM drives are designed for greater durability and reliability than common audio-CD players. A CD-ROM drive has a faster, heavier-duty actuator mechanism inside for quickly and repeatedly seeking back and forth across the disc. A CD-ROM drive's brushless spindle motor (which spins the disc) is rated for at least ten times more use than an audio-CD player's brush motor. The CD-ROM drive also has error-detection and -correction circuitry, SCSI-controller circuitry and ports, and a data buffer for faster transfer speeds.

CD-ROM drives transfer audio data at 150 KBps for compatibility with audio CDs. Most drives in use are first-generation, single-speed devices and consequently transfer data at that same rate. Second-generation CD-ROM drives, like the AppleCD 300 in your IIvx, are double-speed drives that transfer data at about 300 KBps; the Pioneer DRM-604X achieves 600 KBps (see "Double-Speed CD-ROM Drives," *Macworld*, July 1993). Drive manufacturers weren't able to make double-speed drives until they could get faster spindle motors small enough to fit in the half-height form factor of single-speed CD-ROM drives.

Moving a Brick

Q. Bricklike power supplies with a built-in AC plug have always annoyed me because they occupy the space of up to three outlets on a power strip. What kind of cord can I use to move the brick away from the outlet? I've heard that the cord must be short to prevent voltage drop, whatever that is, precluding the use of an ordinary extension cord.

Michael Val Hietter
Jacksonville, Florida

A. You can safely use an extension cord. In fact, if you're traveling with a PowerBook, it's a good idea to carry one so you don't have to sit on the floor at the airport because of the PowerBook's too-short cord. Voltage drop is a lowering of voltage due to the natural slight resistance of wire to the flow of electricity. The longer and thinner a wire, the greater its resistance and the greater the voltage drop from end to end. The voltage drop of an ordinary extension cord is insignificant compared with normal voltage fluctuations.

Caution: Be sure to use a grounded three-wire extension cord with a power-supply brick that has a three-prong plug. Bypassing the ground connection increases the chance of shock to you and damage to the hardware.

LC Choices

Q. If I were to buy Apple's $599 LC III logic-board upgrade, could it accept SIMMs from my existing LC? If not, should I upgrade my LC's memory

continues

now and wait to upgrade the logic board, or upgrade the logic board to an LC III now and wait to install more memory?

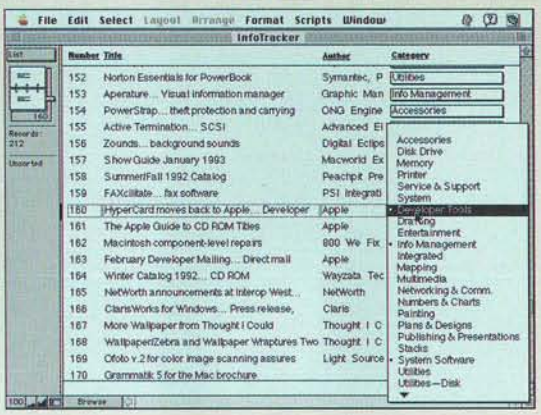
M. Scott Freeman
Raleigh, North Carolina

A. By all means do the LC III upgrade first. You will more than double your computer's speed, and the LC III logic board comes with 4MB of RAM, 2MB more than the LC logic board. You cannot use RAM SIMMs from an LC or LC II in an LC III, so you should expand RAM after installing Apple's LC III upgrade. Because the LC III has only one socket for RAM expansion, you should get an 8MB (or larger) SIMM, for a total of 12MB (or more). A 4MB SIMM costs considerably less and may give you enough total RAM for today, but when you do need more RAM, you will have to toss out the 4MB SIMM to make way for a higher-capacity SIMM.

An LC III (which has 512K of VRAM soldered onto its logic board) can use an additional VRAM SIMM from an LC or LC II to boost its display capability from 8-bit (256 colors) to 16-bit (thousands of colors) on a 14-inch monitor. Although the LC III needs (and can make use of) only an additional 256K of VRAM for 16-bit display, it can use either a 256K or a 512K VRAM SIMM from an LC or LC II. You won't get more colors by using the higher-capacity VRAM SIMM, but at least you will save money by scavenging an old SIMM instead of buying a new one.

MULTIPLE CHOICES

In FileMaker Pro 2.0 (and 1.0) you can select more than one item in a field that's formatted as a pop-up menu. The trick, revealed by Bob Cusick of Simi Valley, California, is to hold down the shift key as you make your second and subsequent selections. FileMaker puts a small dot (or, if you're using TrueType fonts, a small box) next to each selected item on the pop-up menu. When the field is not popped up you see only one of the selected items, but all selections are live (for example, the Find command can find any of them).



File Sharing and Removable Disks

Q. I hate having to turn off file sharing to remove cartridges from my SyQuest hard drive. Any way around this?

JimBWINDOW
via America Online

continues

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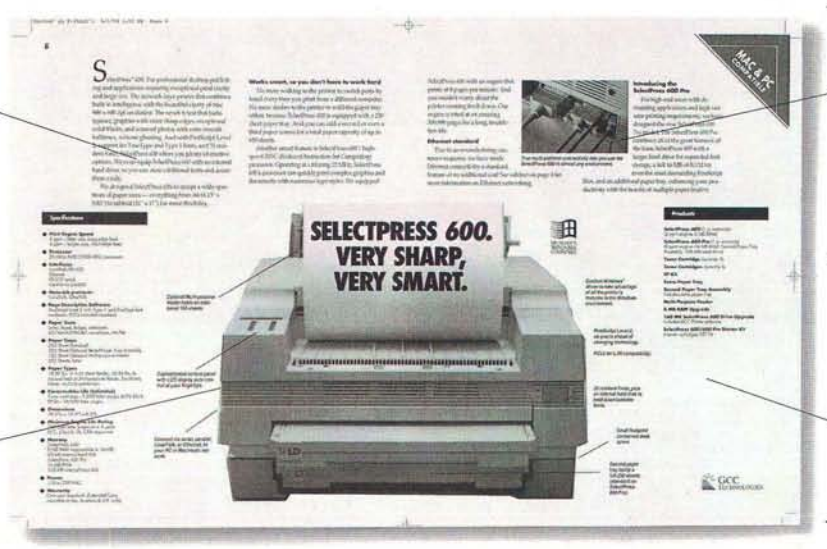

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Smallest File Sizes

Volume Size (in kilobytes)	Allocation Block Size (in kilobytes)
1 to 65,535	1
65,536 to 98,302	1.5
98,303 to 131,070	2
131,071 to 163,837	2.5
163,838 to 196,605	3
196,606 to 229,372	3.5
229,373 to 262,140	4
262,141 to 294,907	4.5
294,908 to 327,675	5
327,676 to 360,442	5.5
360,443 to 393,210	6

The size of a volume (whether a whole disk or a partition) determines the size of an allocation block, which is the smallest amount of space that can be allocated to a file on that volume.

A. If you start file sharing (using the Sharing Setup control panel) with no cartridge inserted, you can subsequently insert and remove cartridges all you want. Unfortunately, this prevents you from sharing cartridges. To share a cartridge you must insert it before starting up file sharing, but then you can't remove the cartridge without stopping file sharing. Tough choice, and one that applies equally to all types of drives with removable media, such as CD-ROM.

The free utility program UnmountIt simplifies removing a cartridge that was inserted when file sharing was started. You simply drag the cartridge's icon to the UnmountIt icon instead of to the Trash. UnmountIt turns off file sharing (if it is on), removes the cartridge's icon from the desktop (also ejecting the cartridge with some types of drives), and then turns file sharing back on (if it was on to begin with). Before turning off file sharing, UnmountIt warns you if anyone is connected to your Mac; it also includes other common-sense safeguards. UnmountIt is on AppleLink (path Software Sampler:AppleSW Updates:Macintosh:Utilities) and can be distributed freely by individuals.

Best Partition Sizes

Q. I want to partition a large hard drive for optimum file sizes. What are the break points for partition sizes at which the minimum file size changes?

Alan Gordon
North Woodmere, New York

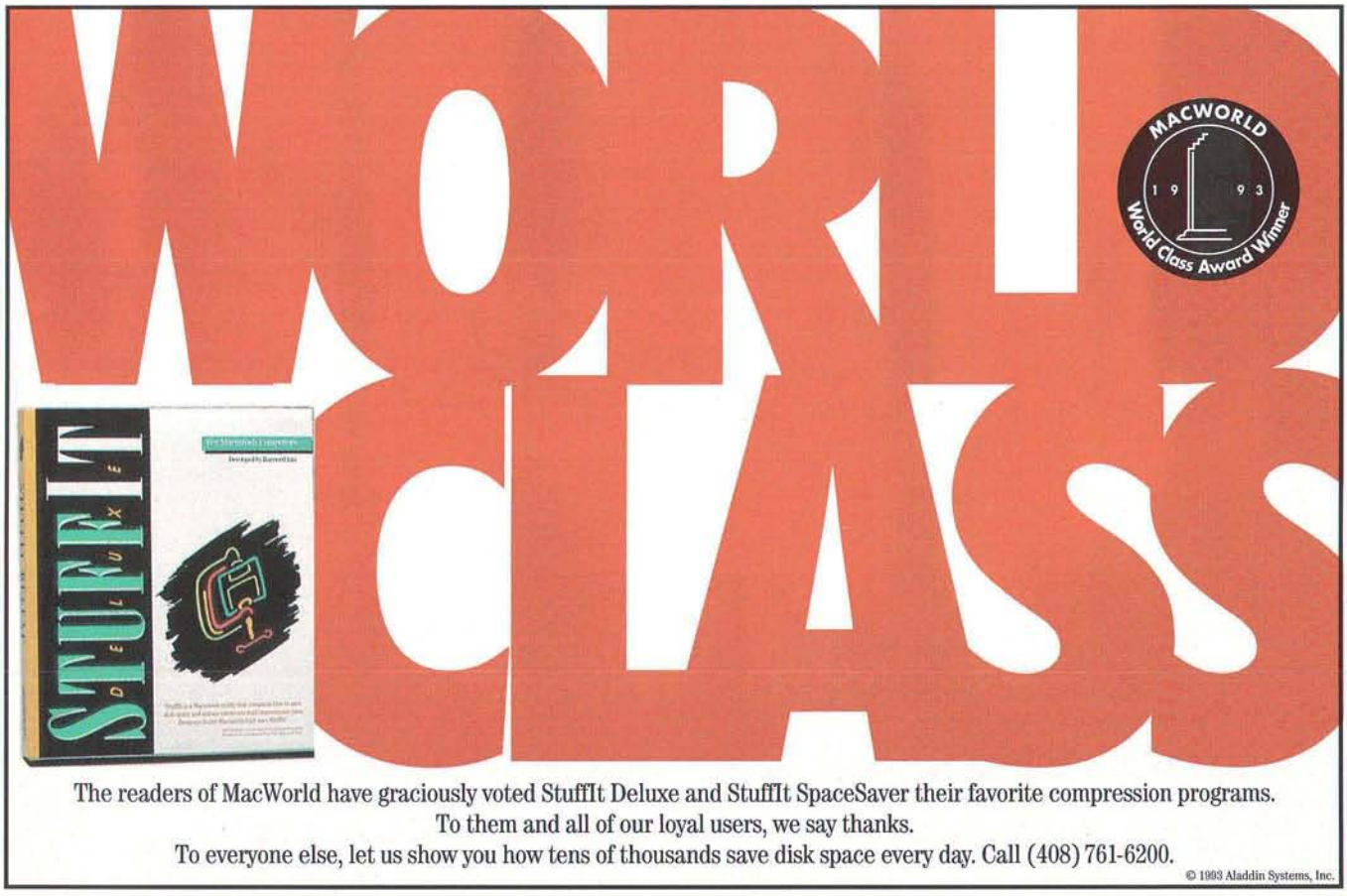
A. If you work with lots of small files, you can save a significant amount of disk space by partitioning a large hard drive into several smaller volumes. For example, a short memo that takes 4K on a 230MB hard drive would take only 1K on a 60MB partition, saving 3K per small file. If you work mostly with large files, though, large volumes are more efficient.

You can partition a hard drive into multiple volumes, each having its own minimum file size like a separate disk (as tabulated in "Smallest File Sizes"). You set the size of a volume—implicitly setting its minimum file size—when you initialize a partition using disk utility software such as Hard Disk Tool Kit from FWB Software (415/474-8055), Silverlining from La Cie (800/999-3919; 503/520-9000), Drive7 from Casa Blanca Works (415/461-2227), or Norton Utilities for Macintosh from Symantec (800/441-7234, 408/253-9600).

Automated Chart Labels

TIP Adding text that labels the value of every data point in an Excel chart can be a laborious process. Also, you may lose the labels if you change the chart type, requiring more labor. The macro shown in "Chart Labeler" automatically

continues



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attaches such labels to every chart type (except surface charts, which don't allow data labels). To set up the macro, you type the listing in cells A1:C26. You must also define six names: ChartName=$B$10, ChartType=$B$15, Columns=$B$6, LabelPoints=$B$2 (designate this a command macro label when you create it), Rows=$B$5, and Sheet=$B$3.

Before running the macro, you must have open both the spreadsheet containing the chart data and the chart you want to label (which can be embedded in the spreadsheet), and you must know the chart name. (Double-click the embedded chart; its name will appear as the title of the chart window that opens.) Finally, you must select the range of cells in the spreadsheet corresponding to the data points you want labeled in the chart. Now you can run the macro by choosing the Run command from the Macro menu. When you enter the chart name, the macro labels the data points on the chart.

Shane Devenshire
Walnut Creek, California

Beep When Ready

TIP Frantic Macintosh users (myself included) wait with bated breath when the pointer turns into a watch, staring at the screen until we regain control of our computers. A simple beep when the watch goes away would give us the opportunity to rest our eyes (if not our brains) while the Mac works, or to do other work within earshot of the computer.

With a macro utility such as QuicKeys you can make the Macintosh beep when it is ready. Create a macro that attempts an impossible action (see "Make My Beep"), and assign it a key combi-

continues

File Edit Formula Format Data Options Macro Window

Normal

A27

Chart Labeler Macro

	A	B	C
1	*Names*	*Formulas*	*Comments*
2	**LabelPoints**	=ECHO()	Supress screen activity
3	**Sheet**	=GET.DOCUMENT(1)	Name of spreadsheet
4		=DEFINE.NAME("points")	Names the selected cells as "points"
5	**Rows**	=ROWS(Sheet&!points)	Counts selected rows
6	**Columns**	=COLUMNS(Sheet&!points)	Counts selected columns
7		=IF(Rows*Columns=1)	Ensures more than 1 column selected
8		=RETURN()	
9		=END.IF()	
10	**ChartName**	=INPUT("Enter the chart name:",,"Name That Chart")	Asks for chart name
11		=IF(ChartName=FALSE)	If Cancel button clicked,
12		=RETURN()	then end macro
13		=END.IF()	
14		=ACTIVATE(ChartName)	Bring named chart to front
15	**ChartType**	=GET.DOCUMENT(9)	Type of chart
16		=SET.NAME("item",5)	Set the type of item to be labeled (for 3D charts)
17		=IF(OR(ChartType<=6,ChartType=10,ChartType=11))	If chart is not a 3D type,
18		=SET.NAME("item",4)	then reset the type of item to be labeled
19		=END.IF()	
20		=FOR("countcol",0,Columns-1,1)	Loop to attach text to selected points
21		=FOR("count",1,Rows,1)	
22		=ATTACH.TEXT(item,countcol+1,count)	Attach text to one data point
23		=NEXT()	
24		=NEXT()	
25		=RETURN()	
26			

Ready NUM

Chart Labeler This macro labels the value of every data point in an Excel chart. It assumes the chart and its linked spreadsheet are open, and that the values to be attached are selected in the spreadsheet.

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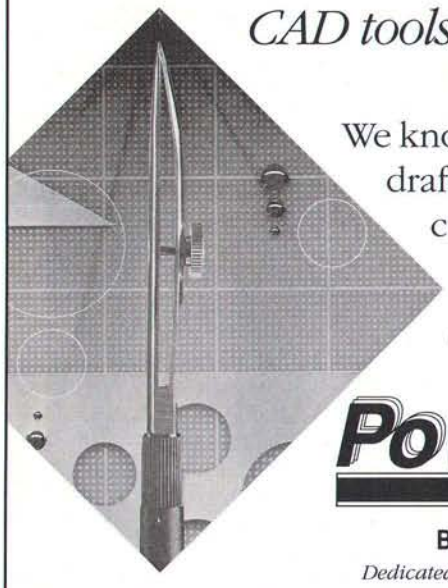
MacWorld, Jan. '93



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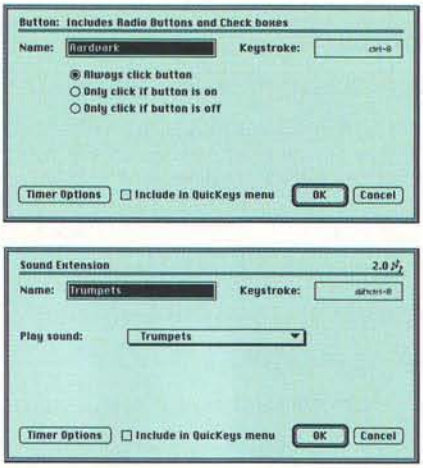
nation that is easy to remember and to press; I use control-*. Press this key combination one or two times when the pointer turns into a watch, and you will hear a beep or two when the computer is ready to let you work.

Daniel Kazez
Springfield, Ohio

Sometimes the alert sounds sooner than you would expect because the Macintosh interrupts its main task to execute the macro. If you press the macro keystroke right after opening a program in the Finder, for instance, you hear the alert within a few seconds, long before the program is ready for action.—L.P.

Scrapbook Preview

TIP Apple's Scrapbook is a handy place to store items for later use, but I've often been frustrated by being able to see only a portion of a graphic or text item in my Scrapbook. Here's how to preview a large Scrapbook entry:



Make My Beep By pressing a macro's keystroke when the pointer turns into a watch, you can get an audible alert when the Mac is ready to let you work again. To make the Mac beep, use a QuicKeys macro that attempts an impossible action such as clicking a bizarrely named button (top) or choosing a nonexistent menu item (not shown). To play any sound installed in the System file use QuicKeys' Sound extension (bottom).

1. With the Scrapbook window active and showing the item to be previewed, choose Copy from the Edit menu.
2. Switch to the Finder and choose Show Clipboard from the Finder's Edit menu.

You can resize and scroll the Finder's Clipboard window to see the entire item.

Susan Doyle
Rapid City, South Dakota

Scrapbook 7.1.2, which comes with QuickTime, reduces large graphic items to fit its small window, but your method is handy for previewing an item full-size or for previewing a long text item. However, you can simplify the process by adding a Show Clipboard item to your Apple menu. Here's how: Open your System Folder and make an alias of the Clipboard file. Rename the alias Show Clipboard and put the renamed alias in the Apple Menu Items folder (inside the System Folder). Now—in step 2—you can choose the Show Clipboard alias from the Apple menu (while any program is active) without first having to switch to the Finder.—L.P. m

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LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Guide to System 7.1* (IDG Books Worldwide, 1992).

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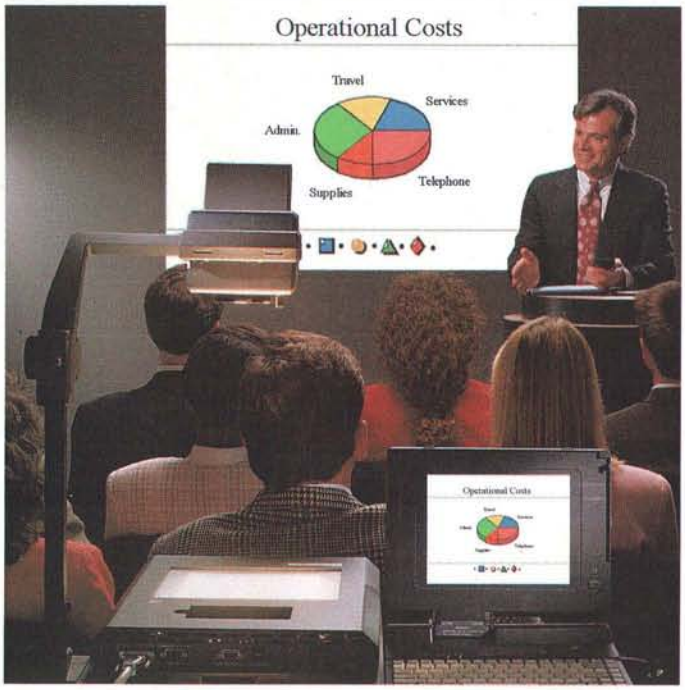

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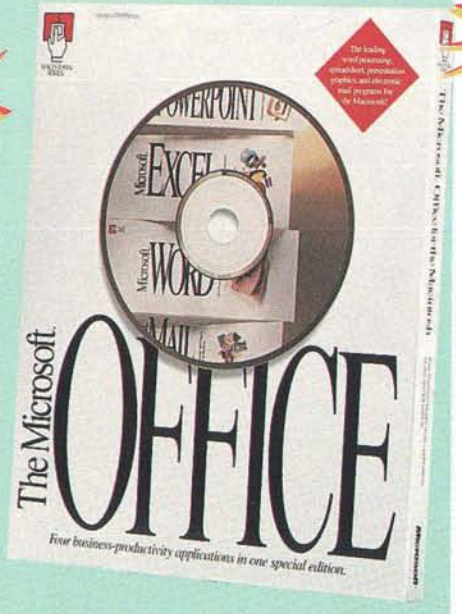

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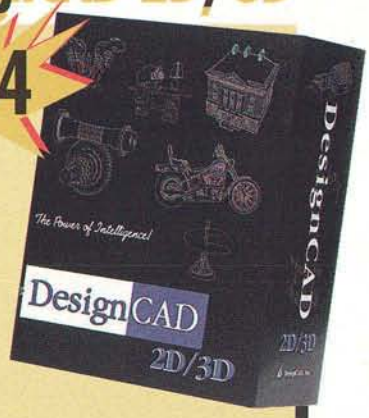

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EDITED BY ELIZABETH DOUGHERTY

Networks

THE LATEST IN CONNECTIVITY AND COMMUNICATIONS

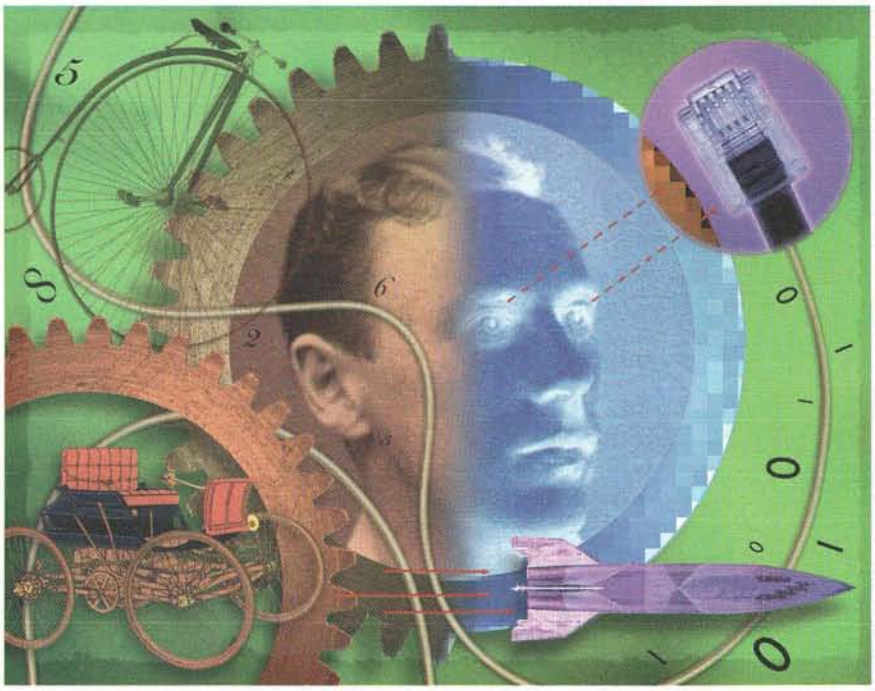
Two Companies Offer FDDI with a Twist

TIRED OF TRYING TO LOOK BUSY FOR the 20 minutes it takes you to save that PostScript file to the server? Now you can squeeze more speed out of your network—up to 100 megabits per second (Mbps)—using new hardware that runs Fiber-optic Data Distribution Interface (FDDI) over simple telephone wiring.

Today's FDDI standard requires relatively rare and costly fiber-optic cabling to get the high bandwidth especially important on Macintosh networks, where large video and image files can choke even 10-Mbps Ethernet. But by basing their products on the as yet unratified X.3T9 standard now being developed by ANSI (the American National Standards Institute), Codenoll Technologies and Cabletron Systems have introduced Mac network hardware that can run FDDI over unshielded twisted-pair (UTP) wiring, the cabling that already strings many networks together today.

By September Cabletron planned to begin selling a $1396 NuBus network interface card (required for each Mac) plus four-port ($3695) and eight-port ($6695) concentrator modules that fit into the company's various managed-network chassis. Codenoll began offering a $1795 NuBus card in July.

Each company claims that its hardware will work with any other FDDI-over-UTP hardware on the market. But until the final FDDI standard is approved and applied in each product, interoperability—which is FDDI's key advantage over proprietary high-speed networks—is not certain. To assuage concerns, Codenoll says it will upgrade its board if the standard does change before its ratification, which is expected to take place as early as the end of this year. Cabletron, 603/332-9400; Codenoll, 914/965-6300.—MARGIE WYLIE



DAVID KAHL

At Ease for Networks

AT EASE, WHICH STARTED ITS LIFE as a Mac idiot-proofer that substitutes a large-buttoned desktop for the Finder, can now help keep networked users, especially those who share one Mac, from trespassing beyond their bounds.

In its update, Apple is offering a stand-alone version, At Ease 2.0 ($59 for one Mac and up to 10 users), as well as a network version, At Ease 2.0 for Workgroups ($295 for 10 Macs and up to 1000 users). Both versions offer the same basic features and improvements. For example, each user now accesses a personalized set of applications and data by typing in a password; private folders keep users' data separate; simple file-management tasks, like deleting or finding a file, can be performed from the At Ease interface; and users can be shielded from the Apple menu or some of its items, including control panels and the Chooser.

In addition, At Ease 2.0 for Workgroups supports numerous and more-elaborate groups and setups, tighter password control, and over-the-network administration. Apple warns that At Ease provides "privacy, not network security." At Ease 2.0 no longer allows users to break into the Finder by illegally exiting programs like HyperCard or by holding down the spacebar so that the At Ease system extension does not load. But a determined snooper could break through using software such as Norton Utilities. Apple Computer, 408/996-1010.—MARGIE WYLIE

Ground Control to PowerBook

UNTETHERED POWERBOOK USERS with an Ericsson GE Mobidem or Motorola InfoTac radio modem can now swap Electronic mail with nearly anyone through the RadioMail wireless messaging service.

HANK OSUNA

The two-way messaging service uses both the RAM Mobile Data and ARDIS wireless networks to transmit E-mail to and from PowerBook users. The company also maintains a series of gateways that let users swap messages with wired E-mail systems (including AppleLink, CompuServe, Internet, AT&TMail, MCI Mail) and pager systems (like SkyTel and Pac Tel). For a monthly fee RadioMail users can also exchange E-mail with a cc:Mail-based home LAN.

For the messaging service, PowerBook and PowerBook Duo users can expect to pay a $99 start-up fee and $89 per month for unlimited E-mail usage and news service. Another $49 goes for a copy of Eudora from Qualcomm, a San Diego company that has developed a version of the popular shareware program that supports the wireless RadioMail Transport. Also, figure $800 or so for a wireless modem. RadioMail, 415/286-7800, 800/597-6245.—MARGIE WYLIE

Computer Esperanto

MOVING A FILE TO A DIFFERENT computer isn't of much use if you can't read it afterward. That's why Farallon has introduced Replica, a $99 document-exchange program that lets users read files created by dissimilar applications, even if the files have been moved from a Windows machine to a Macintosh or vice versa.

Unlike most document-exchange software, including Adobe's Acrobat, Replica enables you to create and distribute self-extracting documents that can be opened by any Macintosh or Windows user, even people who don't have Replica.

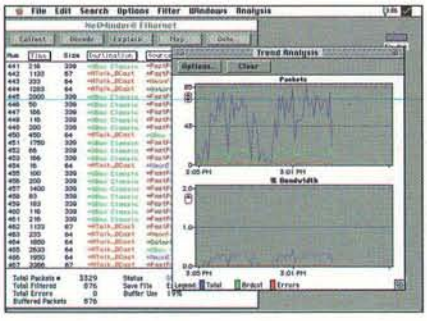
The software works by storing documents in each operating environment's built-in graphics format: QuickDraw for the Mac and Graphics Device Interface for Windows. Recipients use Replica's Viewer to open, read, print, or paste portions into their own documents, where they can edit the converted text or graphics. Senders can include the 250K Viewer as part of the file, and it will be available free on online services. The files can also include TrueType fonts to allow recipients to print text at the maximum resolution of their printers.

Replica files can be compressed, password protected, copy protected, and distributed directly by cc:Mail and Microsoft Mail. Replica for Windows is shipping; Replica for Mac is due by year's end. A ten-pack of the program costs $749. Farallon Computing, 510/814-5000.
—MARGIE WYLIE

Intelligent Network Analysis

A SOFTWARE-PROTOCOL ANALYZER from Neon Software can diagnose some network problems without requiring managers to interpret a single packet.

NetMinder Ethernet 3.0 turns an ordinary Macintosh equipped with an Ethernet network interface card into a workstation capable of eavesdropping on network traffic and reporting back its findings. Like most analyzers, this one still requires operators to sift through the cryptic data it returns to find clues to complex problems. However, a new rules-based engine can detect and alert managers to some warning signs, such as a router passing bad addressing information, the appearance of a new node, or a network that's unreachable.



Neon Software's NetMinder Ethernet 3.0 performs trend analysis on bandwidth use (or other factors) while you wait, along with other analysis tasks.

The update also adds real-time trend analysis of network statistics, to capture and plot selected information such as bandwidth utilization or errors—or even data a user collects through a custom filter. The graphs make it easy to spot unusual clusters of errors or pinpoint times of peak network traffic. Managers can also decode Network File System (NFS) packets, identify TCP/IP nodes by name instead of number, and import data gathered by Network General's Sniffer. Neon Software, 510/283-6507.—MARGIE WYLIE

IN BRIEF

■ **Apple Debuts Site Licenses** You can finally site-license some essential networking software, including AppleTalk Remote Access Client, Data Access Language (DAL) client, TCP/IP Connection for Mac, and SNA ps 3270. 408/862-3385.

■ **Rebates for AppleShare** Apple is offering rebates of up to $1000 for buying AppleShare 3.0 software and either its Workgroup Server 95 or Workgroup Server 95 upgrade kit, until the end of October. 800/776-2333.

■ **Whither NetWare 3270 Emulator?** Where has your Novell terminal emulator gone? Attachmate has taken over development, support, marketing, and sales of the NetWare 3270 LAN Workstation for Macintosh. 206/644-4010.

■ **OSI Upgrade** Apple updated its Open Systems Interconnect (OSI) products, a network protocol stack and E-mail server based on international standards more popular in Europe than in the United States. 800/776-2333.

■ **EtherPort Line Moves to Dayna** Dayna Communications has acquired the entire line of EtherPort network adapters formerly sold by Shiva Corporation, which now plans to focus on remote-access tools with products such as the LANrover and NetModem series. EtherPort users should call Dayna at 801/269-7200 for technical support or sales. In addition, Dayna Ethernet drivers that support EtherPort adapters are available free through AppleLink or from Dayna's BBS at 801/269-7398. Shiva, 617/252-6300.

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Finding a good movie to rent has always been a hit-and-miss process. But now, there's a way to have a hit every time.

It's called **MovieSelect**,™ from Paramount Interactive.

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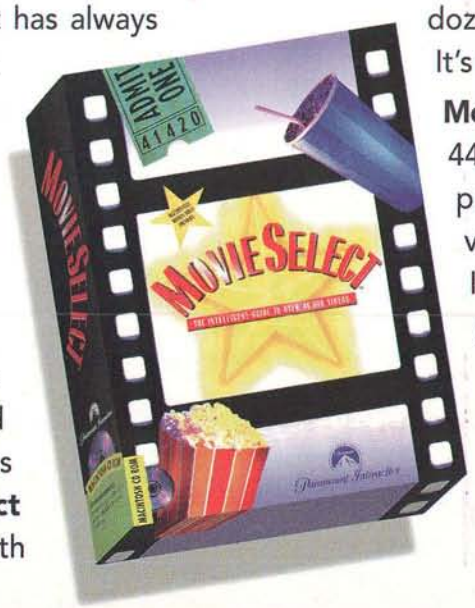

MovieSelect has extensive data on over 44,000 video selections. You can even preview selected hits in full-motion video right on your computer screen.† Instantly find every available movie by your favorite star, or director. Score a direct hit with every rental and **MovieSelect** will pay for itself in no time. If you like movies, this is your indispensible guide.

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MovieSelect was formerly called TasteMate.

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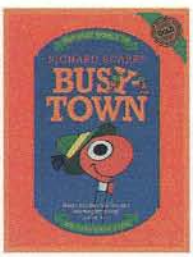
SYSTEM REQUIREMENTS:

MACINTOSH: Macintosh LC or higher, System 6.0.7 or greater, 4 MB RAM, color monitor. CD ROM version requires CD ROM drive. Diskette version requires hard disk with 12 MB free.

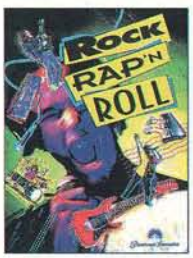
IBM & COMPATIBLES: 386 machine or higher, 16 MHz processor or higher, 4 MB RAM, VGA card with 256 colors, Windows 3.1 or greater, Mouse, Sound board: Sound Blaster, Sound Blaster Pro or compatible, Speakers. CD ROM version requires CD ROM Drive. Diskette version requires 3.5" 1.44 MB disk drive, hard disk with 12 MB free.

3 MORE HITS FROM PARAMOUNT INTERACTIVE

A toe-tapping adventure that teaches kids music.



Kids control the town and learn while they play.



Create music in minutes and jam your socks off.

LINK USERS DOWN THE HALL AND ACROSS THE SEA WITH TCP/IP

GLOBAL CON

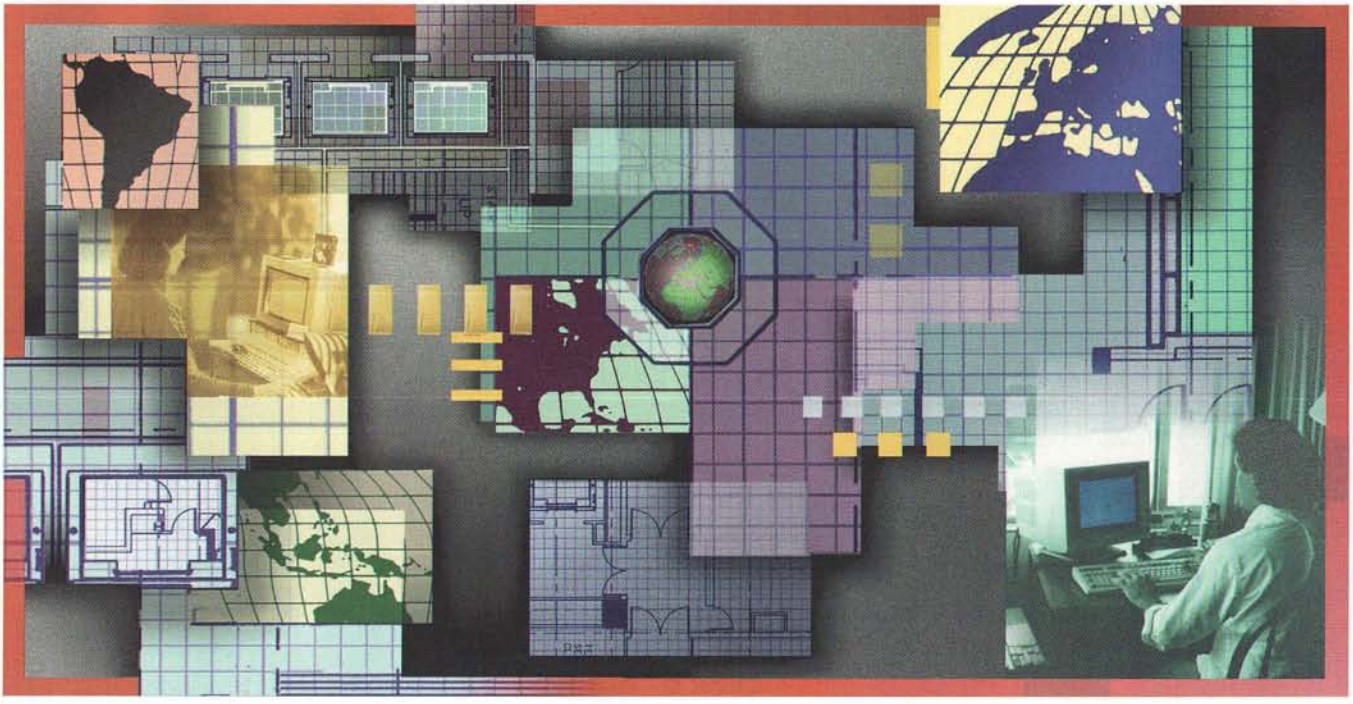


ILLUSTRATION BY JEFF BRICE

NECTIVITY

BY JOEL SNYDER

If you need to connect Macintoshes to the wide world of corporate computers, TCP/IP (Transmission Control Protocol/Internet Protocol) is probably your best choice. TCP/IP has become the common language of internetworking. First used on government and university networks, this protocol was quickly accepted as a standard and evolved into the protocol of choice for Internet communications as well as for connecting disparate machines within a corporate network. Whether your Macintosh users need to send files to a VAX in Frankfurt, read mail from a DOS PC in Moscow, or access data on the DEC in Data Processing, TCP/IP can meet their needs.

A variety of programs provide TCP/IP communications and connect Macs with disparate machines by providing one function: terminal emulation. By using TCP/IP, Macs, and terminal-emulation software, you don't need to buy additional terminal servers, asynchronous ports, modems, or phone lines. Also, the same Mac can participate in client/server applications and file sharing, and run standard Mac apps simultaneously.

Nine products are reviewed here: Pathway Access from The Wollongong Group, PacerTerm from Pacer Software, Mac 320 from White Pine Software, TCP Connect II Basic from InterCon Systems Corporation, VersaTerm from Synergy Software, Reflection 2+ and Telnet Connection from Walker Richer and Quinn (WRQ), 5PM from Advanced Software Concepts, LAN Workplace from Novell, and NCSA Telnet, a freeware program.

Almost all of these products do a good job with the basics: emulating a DEC VT-series terminal, such as a VT100. In addition to VT-series emulation, each product provides other features. Some provide IBM 3270 terminal emulation so your Macs can connect to the mainframe in the MIS department, for example. Others provide file transfer to keep databases synchronized, or E-mail gateways to link Macintosh networks to the rest of the company. Still others provide scripting features. And some may simply have the network toys and gadgets you've been craving. The additional features are what distinguish one product from another, and they are likely to be a deciding factor when you buy.

Terminal Emulation

Terminal emulation in the TCP/IP world is the same as it is everywhere else: using terminal emulation, the Macintosh looks like a terminal to a minicomputer or mainframe. The traffic flows over the network instead of over a modem or serial connection, eliminating the need for extra communications equipment, such as terminal servers or modems.

But not all VT-emulators are created equal. The most difficult-to-use and featureless ones I saw were the VT102 and VT320 display managers built into the basic Communications Toolbox from Apple (see "A Blueprint from Apple" for details on the Communications Toolbox). If you want a terminal that acts only as a VT102, you'll be happy with this level of emulation. But those display managers aren't very powerful. For example, if you want to make use of a 21-inch color screen by having a nice big terminal window of 48 lines with a light gray background, you're out of luck—Apple's VT320 can't do it.

The communications applications I reviewed did an excellent job of terminal emulation, with the exception of WRQ's Reflection 2+, which stubbornly refused to make a terminal window any longer than 6.5 inches. Instead, as I tried to extend the window, Reflection made the font smaller, and smaller, and smaller.

Advanced Software Concepts' 5PM starts with Apple's emulator but provides some excellent enhancements, including the asc420 display manager, which provides beautiful terminal emulation. If you can't justify the $465 for this configuration of 5PM, which also provides file transfer, Synergy Software's VersaTerm provides excellent terminal emulation for only $195.

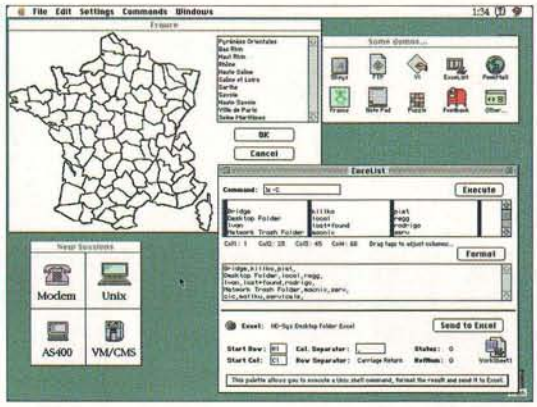
With VersaTerm, it was easy to set up terminals that looked good on my test Macintoshes. And Synergy offered technical support beyond what I had come to expect from Macintosh software vendors. When I encountered a bug in the software, VersaTerm's developers worked with me over a weekend to find a fix. My only complaint is that, although you can have multiple sessions active, only one can be "on screen" at a time.

At a slightly higher price ($249), Pacer Software's new version of PacerTerm clears up the horrible terminal-emulation problems of preceding versions to provide an attractive display. And PacerTerm's nifty extras, including scripting (a feature I will discuss later), make it a pleasure to use.

The terminal emulation in White Pine's Mac 320 ($149) is also excellent, but unexplainable crashes during stress testing on my demonstration systems make it a less desirable choice.

Novell's LAN Workplace provides only passable terminal emulation. At $399, it is an overpriced, bare-bones application, lacking scripting capability and file-transfer support at the server, among other things. LAN Workplace will leave most Macintosh users wanting more.

Although every package supports some form of VT-series emulation, many of the seldom-used features of DEC terminals, such as downloadable character sets and color graphics options, aren't included in the base price of each emulator. Wollongong's Pathway Access, White Pine's Mac 300 series, InterCon's TCP Connect II Basic, WRQ's Reflection 2+, and Advanced Software's 5PM charge different prices for those additional features, with most vendors charging from $100 to $200 for them. If you need an unusual feature, such as DEC's special graphics language, ReGIS, make sure the package you select has it.



The Fancy Stuff Through scripting and graphical interface tools, some packages (like 5PM) can mask clumsy mainframe apps with a more Mac-like interface.

Transfer, Please

File transfer is another feature that each of these products offers in some form, but again, all the products are not created equal.

In the TCP/IP world, file transfer occurs through the File Transfer Protocol (FTP). Ordinarily, FTP runs on both the server and the client, so that the client on one platform may initiate a transfer with a server on another, and vice versa. WRQ's Reflection 2+ and White Pine's Mac 320 support file transfer at the server only; the Macintosh cannot initiate file transfers. Pacer Software's PacerTerm and Novell's LAN Workplace support only client FTP, in which the Macintosh must initiate the file transfer; the server cannot. All the other products offer both client and server FTP, although 5PM's FTP client costs an additional $140.

Unless password protection is used, an FTP server leaves your Macintosh open so that anyone can read or write to any file. NCSA Telnet and White Pine's Mac 320 fall seriously short in this area: neither requires a password for FTP access. The other packages either always require passwords or allow you to decide whether passwords will be required.

Although some of these communications products may not offer the file-transfer capability you want, you do not have to depend on these applications for FTP. Several excellent, easy-to-use standalone FTP client and server programs are available as shareware (see "TCP/IP Freeware and Shareware").

Bells and Whistles

In addition to basic terminal emulation and file transfer, some of the packages I looked at offer special emulations, scripting features, and E-mail capabilities.

Connecting a Macintosh to an IBM mainframe over TCP/IP requires 3270 emulation. Only four of these packages support 3270 emulation: Wollongong's Pathway Access, InterCon Systems' TCP Connect II, Advanced Software's 5PM (with the asc3270 terminal tool), and the freeware package NCSA Telnet. Pathway Access is the only package that emulates a 3179G, IBM's color graphics terminal.

Most newer applications display directly on personal computers or graphics workstations. But many older mainframe and minicomputer graphics applications are designed to work with the workhorse Tektronix 4014 graphics terminal. Wollongong's Pathway Access, White Pine's Mac 320, InterCon Systems' TCP Connect II Basic, Synergy Software's VersaTerm, and NCSA Telnet all support Tektronix 4014. VersaTerm includes monochrome Tektronix in the base package for free, White Pine charges an extra $100 for monochrome Tektronix support, and Wollongong charges $250. Synergy also sells VersaTerm-Pro, which adds color Tektronix 4105 to the standard package for an additional $100.

Scripting and command languages are other popular additions to basic terminal-emulation packages. Most users will be happy with basic scripting features: automating the process of logging on, checking E-mail, and doing simple file transfers. But if you've got the time to

write communications scripts, some very powerful tools are available for the task. Advanced Software's 5PM is the leader in this area. A trio of strangely named tools comes standard with Advanced Software's basic package. Vamps, Palettes, and Esmerelda let you build Macintosh-style applications so that users need never see what a mainframe looks like. Close behind Advanced Software's 5PM are WRQ's Reflection 2+, Pacer's PacerTerm, and Wollongong's Pathway Access. All have very sophisticated scripting that enables you to automate many routine communications tasks.

Very restrained in their scripting capabilities are Synergy's VersaTerm and White Pine's Mac 300 series. Both let you automate simple tasks, such as logging in, but they lack the programming power of the Wollongong, Pacer, and Advanced Software products.

Aside from terminal emulation and file transfer, many communications applications support other common TCP/IP applications. Wollongong's Pathway Access is the only one that includes lpr/lpd software; InterCon's add-on InterPrint ($195) supports lpr. With lpd, users of Unix workstations print to AppleTalk-connected printers, and lpr lets Macintosh users print to printers attached directly to Unix systems and not to the AppleTalk network.

Slip Me Another

Connecting a Macintosh directly to a LAN is pretty easy. But how do you connect users who go on the road or work at home? TCP/IP's equivalent of AppleTalk Remote Access (ARA) is called SLIP, for Serial Line IP. Like ARA, SLIP requires a system on the LAN to accept the incoming connections and handle routing. Unix and OpenVMS minicomputers or dedicated TCP/IP routers can support incoming SLIP connections.

Of the packages I looked at, only Synergy's Versatilities ($145), or InterCon's TCP/Toolz & Toyz ($149).

The other TCP/IP gift from Apple is MacTCP, which provides the basic TCP/IP protocol stack. MacTCP works over LocalTalk, Ethernet, and Token Ring networks. With MacTCP, application designers can concentrate on terminal emulation or file transfer—instead of reinventing TCP/IP. At the user end, if you don't find one communications program with all the features you want, MacTCP lets you run multiple TCP/IP applications at the same time.

All of the commercial products I evaluated come with MacTCP. Freeware users take note: if your package doesn't come with MacTCP, you may not need to buy a copy. Your site may already have purchased one of Apple's inexpensive site licenses. MacTCP 2.0 includes the Simple Network Management Protocol (SNMP), the protocol within TCP/IP that large-network managers are likely to find useful.

Next time you hear an MS-DOS user cursing about how this Ethernet board doesn't work with that software, or how you can't run five different network packages at the same time, snicker softly: MacTCP and the Communications Toolbox mean that Macintosh users need never worry about such incompatibilities. Everybody stand up, turn toward Cupertino, and say, "Thank you, Apple."

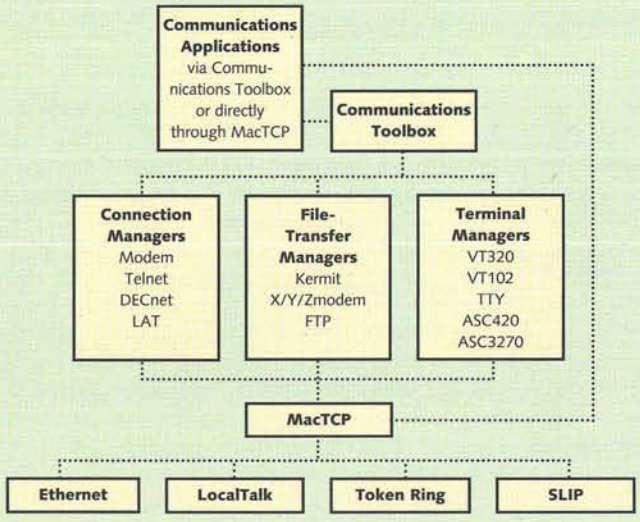
A BLUEPRINT FROM APPLE

The designers of Macintosh networking products got some help from Apple in the form of the Communications Toolbox and MacTCP. An option in System 6 and built into System 7, the Communications Toolbox comprises connection managers, terminal managers, and file-transfer managers.

Connection managers let applications connect to other hosts. For example, Apple's Serial Tool is a simple connection manager that lets applications use the Mac's serial port to talk to modems and hosts. Terminal managers emulate some type of terminal, such as a DEC VT100 or an IBM 3270. Apple provides DEC VT102, DEC VT320, and dumb TTY tools as part of the basic Comm Toolbox. File-transfer managers let applications transfer files without knowing about protocols, such as X/Y/Zmodem and Kermit. In the TCP/IP world, the relevant file-transfer tool would support the File Transfer Protocol (FTP). Apple provides Xmodem and Text Tools as part of the basic Comm Toolbox, so you must get FTP support from another application. Many of the communications packages I looked at in the accompanying article build on some of these basic functions.

An application that fully supports the Comm Toolbox is easier to expand than one that doesn't. For example, suppose you're working with a communications application that supports TCP/IP and standard modems but does not use the Comm Toolbox. If you need to talk to a DEC host using DECnet or an IBM host using Systems Network Architecture (SNA), you've got to buy and learn a new communications program. But if your application supports the Comm Toolbox, you simply plug in a new manager.

Unfortunately, vendors have just begun to see the benefits of supporting the Comm Toolbox. Only two communications applications in this review offer full support—Pacer Software's PacerTerm and Advanced Software Concepts' 5PM. And I found only three companies that sell tools to extend TCP/IP support to applications supporting the Comm Toolbox. If you're working with a terminal emulator that doesn't support TCP/IP but does support the Comm Toolbox (Apple's MacTerminal is a good example), you can add TCP/IP support by buying Advanced Software Concept's TCPack ($95),



Help from Apple The Communications Toolbox and MacTCP work together to provide a base for other communications applications.

ergy's VersaTerm supports SLIP as a Link Access Protocol (LAP) through MacTCP (for more on MacTCP, see the sidebar "A Blueprint from Apple"). With LAP support, SLIP becomes available to any TCP/IP application on the Macintosh. While InterCon's TCP Connect and NCSA Telnet also enable you to use SLIP, you can do so only within those applications.

If you're already happy with your TCP/IP communications application and want to add SLIP, no problem. You can buy a SLIP LAP for MacTCP from TriSoft (512/472-0744, 800/531-5170). Hyde Park's MacSLIP ($49.95) has its own scripting and command language to help modems navigate and make the SLIP connection. InterCon has also announced that it will be making a free SLIP LAP for MacTCP available for anonymous FTP over the Internet.

What's Right for You

Choosing the right TCP/IP communications application really depends on your needs. If you want good terminal emulation and a little file transfer, and you don't want to spend a lot of money, consider

Options for TCP/IP Emulation

Product	Company	Phone	Price (as Configured)	Uses Comm Toolbox Connection Managers
Pathway Access	The Wollongong Group	415/962-7100, 800/872-8649	$295	○
PacerTerm	Pacer Software	619/454-0565	$249	●
Mac 320	White Pine Software	603/886-9050	$149	●
TCP Connect II Basic	InterCon Systems Corporation	703/709-9890, 800/468-7266	$195	○
VersaTerm with Versatilities	Synergy Software	215/779-0522, 800/876-8376	$149	●
Reflection 2+ and Telnet Connection	Walker Richer and Quinn	206/324-0407, 800/872-2829	$378	●
5PM, asc420, FTPack, and TCPack	Manufactured by Advanced Software Concepts; distributed by Helios USA or OpenConnect Systems	408/864-0690 or 214/484-5200	$455	●
LAN Workplace	Novell	801/429-5588, 800/638-9273	$399	○
NCSA Telnet/tn3270	(not sold commercially)	via anonymous FTP or 800/624-2237	freeware	○

● = *yes;* ○ = *no.*

TCP/IP FREEWARE AND SHAREWARE

A lot of freeware and shareware is available for Macintosh TCP/IP. Most of it is available on CompuServe or via anonymous FTP on Internet. If you don't have access to either, ACES (800/624-2237) has put together a Macintosh Networking Kit ($55) of TCP/IP shareware and freeware.

If you're online, there are many to choose from, some fabulous, some simply cheap. Popular contenders include the following:

Terminal Emulators NCSA Telnet/tn3270 is definitely the most notable. Another freeware contender, Termy (by Tim Endres), depends on Comm Toolbox tools, so you're stuck with Apple's VT320.

Toolbox Tools TGE TCP Tool (also by Tim Endres) is the missing piece that makes a Comm Toolbox–aware emulator work over MacTCP. If you've already got MacTerminal, you can plug in TGE TCP Tool. This program isn't of commercial quality, but it is free.

Transport If MacSLIP's (Hyde Park Software) $49.95 price tag is too high, you can try the Point-to-Point Protocol (PPP, from Merit Network Inc. and the University of Michigan), a freeware Link Access Protocol (LAP) for MacTCP. PPP isn't as widely supported as SLIP, but it is destined to eventually replace SLIP.

File Transfer For an FTP server, FTPd (by Peter Lewis) is a sophisticated application that uses AppleShare permissions to handle FTP service. Xfer It (shareware by Steve Falkenburg), HyperFTP (freeware by Douglas Hornig), and Fetch (freeware by Jim Matthews) are all easy-to-use client programs.

Mail Reading mail over TCP/IP using the Post Office Protocol (POP) and the Simple Mail Transfer Protocol (SMTP) is very popular at universities. Eudora (freeware by Steve Dorner), POPmail (freeware by the University of Minnesota's Microcomputer and Workstation Networks Center), and Mews (freeware by Charles Lakos) are all available; I like Eudora's interface the best. To build an entire freeware Mac-to-TCP/IP mail network, consider MacPost Server & Client (by Joakim Bengstom and Lars Sigebo), a client/server application for a network of Macs, or LeeMail (shareware by Lee Fyock), which handles a single Mac.

News Usenet News is a popular way to while away an otherwise boring day. If you're lucky enough to have a News server on your network, there are four Network News Transfer Protocol (NNTP) news readers for the Macintosh. Nuntius (freeware by Peter Speck), TheNews (shareware by Bill Cramer), and Stacked News (freeware by Georg Gollmann) are all pretty good, but my favorite is NewsWatcher (freeware, originally by Steve Falkenburg).

Toys and Tools The Macintosh is a favorite platform for all sorts of TCP/IP tools and toys. The information-retrieval protocols Archie, Gopher, and WAIS (Wide Area Information Service) are must-haves for anyone connected to the Internet. Other fun possibilities include Finger and Talk programs, and Chat and MUD clients.

Finger lets you see who is logged onto a remote minicomputer, and Talk lets you have an electronic conversation with someone on the network. Chat is a multiuser 24-hour cocktail party. MUD is the Multi-User Dungeon, a multiuser Dungeons-and-Dragons adventure game run on minicomputers all over Internet.

My vote for most useful shareware, though, is Pete Resnick's Network Time, a product that keeps your Macintosh clock in sync with other TCP/IP systems on the network.

Uses Comm Toolbox File-Transfer Managers	Uses Comm Toolbox Terminal Managers	Supports Serial Ports and Modems	IBM 3270 Emulation (tn3270)	Tektronix 4014 Emulation	Scripting/ Command Language	SLIP	FTP Client	FTP Server	Notes
○	○	○	●	●	●	○	●	●	Includes Graphical Keyboard remapping and lpd/lpr printing support. Options include IBM 3179G, Mail (SMTP/POP/IMAP/NNTP), and client NFS.
●	●	●	○	○	●	○	●	○	
○	○	●	○	●	○	○	○	●	Bundled with QuicKeys Lite. Options include VT340 Graphics.
○	○	●	●	●	○	●	●	●	Options include E-mail (POP/SMTP), Usenet News (NNTP), lpr, VT240 graphics, PH (phonebook) client, andclient NFS.
○	○	●	○	●	●	●	●	●	Includes MAIL and Usenet News. Options include Terminal Server and Network Time. Tektronix 4105.
○	○	●	○	○	●	○	○	●	Options include VT340, HP 700/92, and HP 2393A graphics.
●	●	●	●	○	●	○	●	●	Supports MacWorkstation. Options include SNA and IBM terminal support (work with Apple SNAPs), IBM 5250 and VT420 emulations.
○	○	○	○	○	○	○	●	○	Includes Whois and Finger.
○	○	●	●	●	○	●	●	●	

Synergy's VersaTerm. VersaTerm is the king of the bell-and-whistle bunch but is reasonably priced. In addition to file transfer and SLIP, VersaTerm includes software to keep your Mac's clock synchronized and to turn a Macintosh into a full-fledged terminal server. VersaTerm also provides basic scripting features, and Synergy's new add-on, VersaTerm Link, includes TCP/IP-style E-mail and Usenet News. You get a lot of features for $149.

Next on my list is Pacer Software's PacerTerm at $249. Pacer packed enough features into PacerTerm to make me feel as if I were really using the power of the Macintosh and not just working on a dumb terminal.

If you're a scripting maniac, check out Advanced Software Concepts' 5PM package, with the optional VT420 emulator and FTP software. 5PM is more expensive than the competition, but if you want the ultimate power in scripting and interface control, it's hard to beat.

Wollongong's Pathway Access also has excellent scripting facilities at a much lower price than that of 5PM. Pathway Access serves some smaller niches. It's the only package with IBM 3179G graphics and lpr/lpd printing. Beware, though: Pathway Access only supports TCP/IP communications and doesn't use the Comm Toolbox. This shortcoming means that you can't use the same terminal emulator for TCP/IP and other networking protocols. For example, you'll need two emulators to use TCP/IP and Kermit. WRQ's Reflection 2+ also offers good scripting, but Reflection's terminal emulation isn't as flexible as the competition's.

InterCon's TCP Connect II Basic is an attempt to solve all needs in one package. As a mature package, it has outstanding terminal emulation; lots of fun features, including software for reading Usenet News, sending and receiving TCP/IP E-mail, and querying electronic phone directories; and excellent performance. Once you've figured out how to navigate the complex setup, TCP Connect is a breeze to use. Its VT-series and IBM 3270 terminal emulations were also very nice and worked without glitches or crashes. However, TCP Connect doesn't use the Comm Toolbox at all, which means that if you want to go beyond MacTCP and the simple serial interface, you have to switch packages.

If you're interested in Network File System (NFS) operations, the Sun-developed distributed-file system, only Wollongong and InterCon sell an NFS client for the Macintosh.

Finally, for the Macintosh user on a limited budget, NCSA Telnet/tn3270 isn't a bad choice. The terminal emulation and features don't stack up to some of the other choices, but the price is right.

These recommendations are meant as guidelines. Terminal emulators are very personal applications. You may like a package I don't recommend. And because this market is becoming very competitive, vendors regularly update prices and feature sets. Try several packages before committing to one. Most vendors offer demonstration copies to people making quantity purchases, and the big mail-order houses offer 30- or 60-day money-back guarantees. m

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TCP/IP SOFTWARE

MW EDITORS' CHOICE

Macworld reviewed nine TCP/IP-capable terminal-emulation packages, looking for a balance of solid basic features, usability, price, and extras.

VersaTerm with Versatilities For most users, VersaTerm provides a complete feature set at a reasonable price. You get file transfer, scripting, E-mail, a news reader, directory services, and SLIP, in addition to the product's core functionality as an excellent terminal emulator. **Company:** Synergy Software. **List price:** $149.

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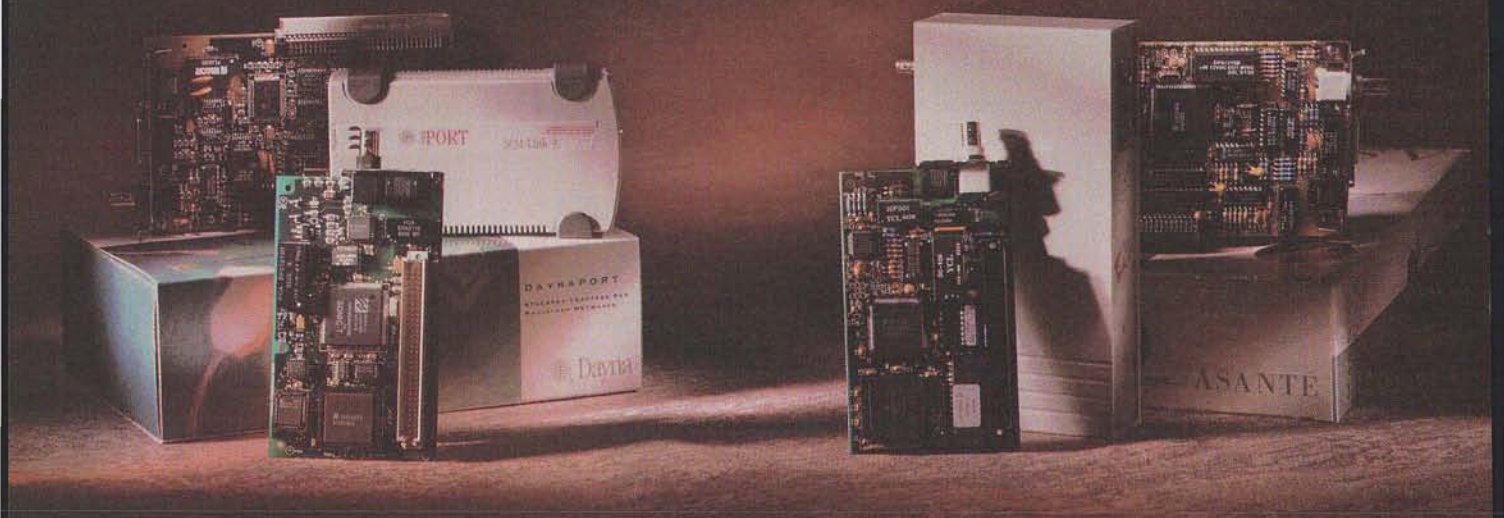

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Media compatibility guarantee	✓	
SCSI Ethernet adapter	✓	✓
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PATHWORKS

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USE EXISTING PHONE LINES TO STREAMLINE YOUR NETWORK WIRING

BY DOUGLAS E. WELCH

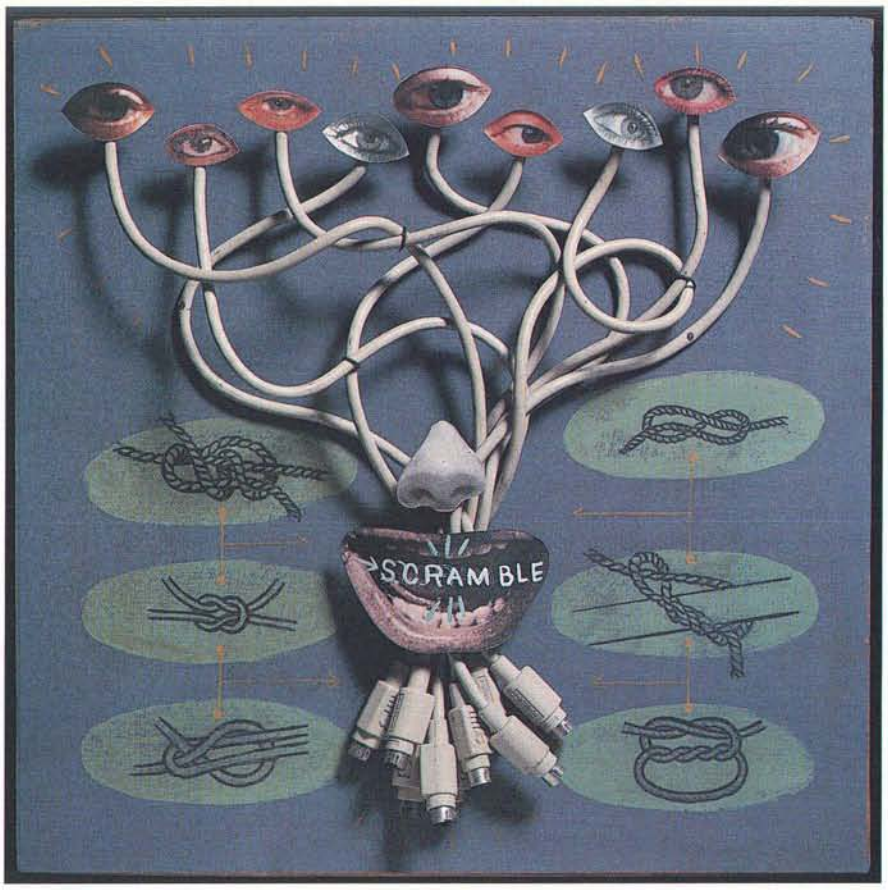


ILLUSTRATION BY GARY TANHAUSER

TAMING THE NETWORK BEAST

Macintosh networks seem to have lives of their own. Connect a couple of Macs together with LocalTalk, and pretty soon wires sprout everywhere, growing over cubicle walls and under floor mats. Eventually, network tentacles encircle the workgroup, taking some unsuspecting person hostage; a departmental network manager is born.

If you find yourself in the grips of a spontaneously generating Macintosh network, your salvation may be as close as the nearest phone jack. Using the untapped capacity of the phone wires already in your walls, you can bring some order to your LocalTalk network wiring, without going to great expense. Of course, the best scenario for any network manager is to wire a new office or building before users settle in. Most phone wiring isn't designed to carry data. So, while the AppleTalk protocols can usually run on phone wires at low LocalTalk speeds, you won't get optimum performance. And don't even consider trying to run faster 10BaseT Ethernet over a voice network. Still, existing phone wiring can offer a more attractive temporary solution to the jumble of cables, until you can install dedicated network wiring.

Most of what you need is already in place: all companies have phones; phone equipment, including wiring; and usually a staff to maintain them. If you manage a departmental Macintosh network, consider taking advantage of those existing resources until you can install a complete network wiring solution.

How to Rewire

How do you move a Macintosh network onto phone wiring? You'll need to make three changes: (1) add a jack to carry data over the existing phone network, (2) add

phone-style LocalTalk connectors (technically, transceivers) that attach each Mac to the phone network, and (3) connect together the other ends of the network.

Add a jack Standard phone systems are wired with two pairs of cable within a single sheath for each wall jack (see "A Quick Network over Phone Wire"). Typically, the phone system uses only the two inside wires (usually green and red). The outside pair (black and yellow) are free to be used for a standard LocalTalk connection. PBX systems may use a six-wire connector but have only four of the wires connected—again, leaving one pair free for the network.

The quick-and-dirty way to adapt the extra wires to a network connection is to open the phone-jack box or wall plate. Find the unconnected pair of wires, then attach to a new, separate jack, which just dangles off to the side of the existing jack. A much neater installation method is to combine the connections on one double-jack plate. However, this installation requires rewiring both the network and phone connections so that all the wiring is contained within the wall.

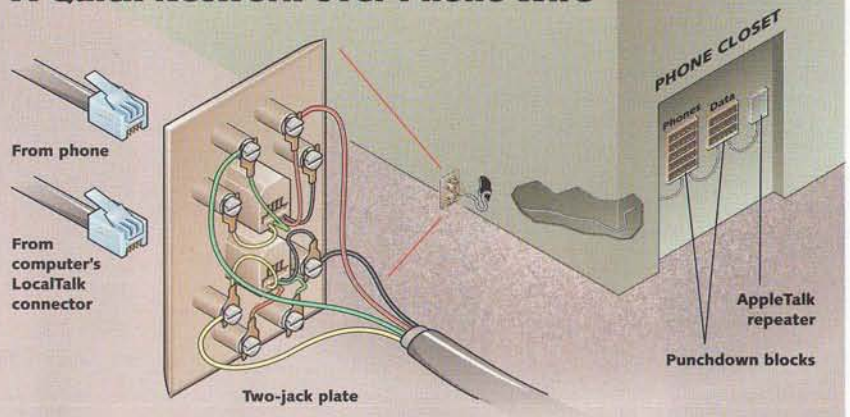
Install network transceivers Although LocalTalk is built into every Macintosh, it isn't designed to run on phone wire. To connect your Mac to the phone jack, you must buy a transceiver. Just as people commonly use the brand name Kleenex to refer to any facial tissue, many use the name PhoneNet (Farallon Computing's product and the first transceiver of this type) to refer to all transceivers. However, many different companies make them, and you can find a PhoneNet-type connector at your local computer store or by mail for $35 or less.

Punch down loose ends After you add extra jacks to your phone network, attached a PhoneNet-style LocalTalk connector to each Mac, and plugged it into the data jack, you must connect all the network wires on the other end.

All the phone wires in a building (or on a floor in a multifloor building) feed into a central location, the phone wiring closet. Your company's telecommunications staff, or another telecom expert, can punch down the network wires at a punchdown block (or terminating block) in the phone closet.

Connecting each pair of wires to the punchdown block creates a passive star network. In each pair, one wire runs from the punchdown block and one runs back to the Mac. The passive star arrangement is suitable for small workgroups. But, as workgroups grow, the wiring-length restrictions of LocalTalk can cause problems; the network signals may not make it to all parts of a passive star net.

A Quick Network over Phone Wire



To piggyback network traffic onto existing phone wiring, you need to make some changes on both ends of your telecommunications network. At each desk, replace the existing phone jack with a two-jack plate. Reconnect the phone wires (red and green) to one set of contacts. Connect the two unused wires (usually yellow and black) to the second set of contacts. (For a faster, but messier, installation, connect the spare wires to a second jack hanging off the side, leaving the phone wires attached to the original jack.) Punch down the data wires to a separate block; ask a telecom expert to do it if you don't know how. You can add an optional AppleTalk repeater or hub to strengthen the network signal.

If the telecom group is willing, have it set up a separate punchdown block strictly for network connections. Often, this task simply requires running jumpers from the original phone punchdown to the new location. With a separate punchdown block, the network staff can work on its wiring without interfering directly with the existing phone wiring. A separate punchdown block also eases installation of the LocalTalk active hub.

Add a LocalTalk hub, such as Farallon's StarController, to amplify the signal and allow for longer wire lengths. This active star configuration will increase the reliability of the network. It will also allow you to expand the network to other offices or floors in the future.

The Limits of Phone Wire

Phone wiring does have some limitations. It may not be of the correct type or quality to carry network signals. In some buildings, especially older ones, the wiring is barely adequate for phone signals, let alone network traffic. So phone wiring usually doesn't allow for the use of higher-speed protocols, such as Ethernet. And interference, from high-voltage electrical lines and lighting fixtures, for example, can also cause problems. Interference that might register as a barely audible hum on a phone line may keep a network from working at all.

The lowest grade of data cabling is called Category 3. Usually phone wiring is Type 1. You can ask your telecom experts what kind of wiring your building has installed, but that is sometimes a crapshoot. Since phone wiring can be so poorly documented, they may not know. But they can help you test lines to see how much static you are likely to encounter.

AppleTalk, the language that LocalTalk networks speak, is a fairly robust protocol, but even it can break down if the wiring is too long. Unfortunately, the only way to find out is to ask. If the telecom folks don't know, you may have to learn by trial and error.

Picking the Best Approach

Start planning to wire your building for data, using the proper grade and lengths of wire. Moving to dedicated network wiring lets you slowly upgrade the network from LocalTalk to high-speed Ethernet, starting with the machines that require a faster network now.

If you have the luxury, however, rewire your building for data from the start, using the proper grade and lengths of wire. (Your telecom folks can help you find and negotiate with wiring vendors.) Otherwise, use existing wiring as a temporary solution. You can reuse networking equipment, such as hubs and punchdown blocks, in future installations.

Sometimes the necessities of network management require speedy answers to difficult problems. Using existing phone wiring can be a quick way to install or grow a network when the chips are down. It provides one more tool in the network manager's fight to keep the network and its users productive. ■

DOUGLAS E. WELCH is a free-lance writer and a microcomputer analyst for a major entertainment corporation in Southern California.

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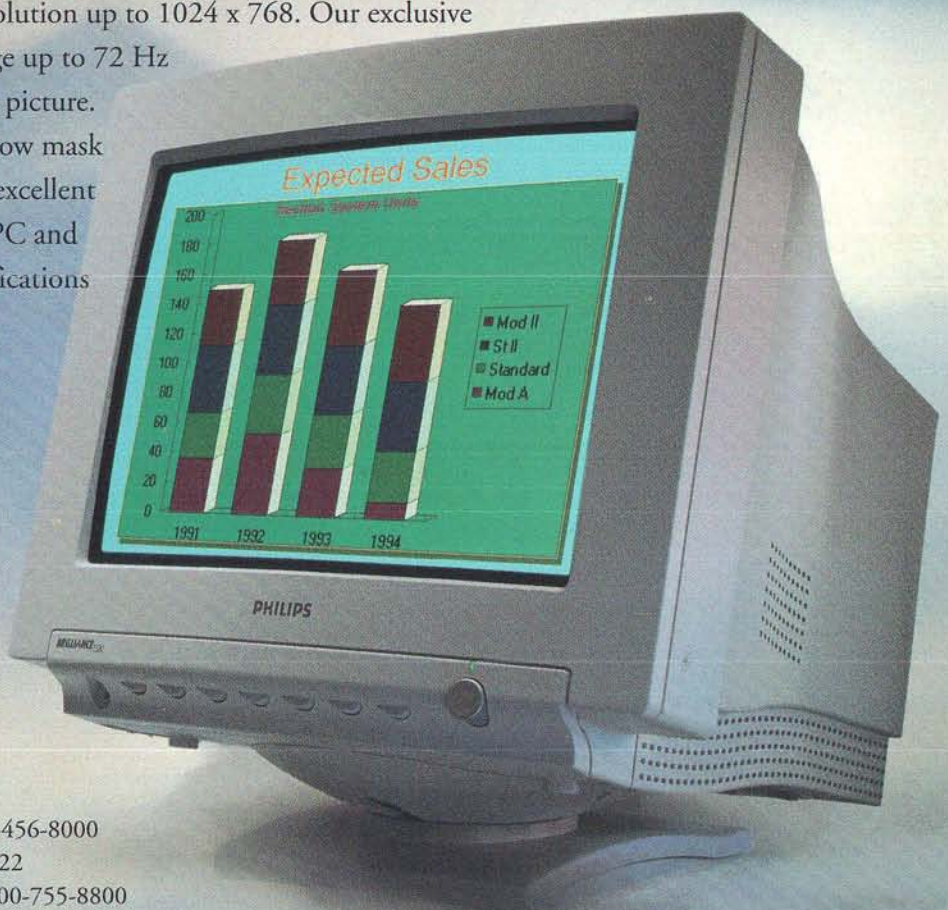

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Circle 69 on reader service card

NETWORKS

BY CARY LU

PowerBook Notes

PowerBook-Friendly Software

MOST MAJOR SOFTWARE PACKAGES DESIGNED for desktop Macs have grown so large through the constant demand for new features that they hog a lot of hard disk space and RAM. And they assume that the hard drive runs all the time.

By comparison, PowerBook-friendly software requires minimal storage and RAM and rarely needs to wake up a sleeping hard disk. Of course, if you add more RAM for a total of at least 8MB, you can run a large program within a RAM disk, but few PowerBook owners actually do this (see last month's *PowerBook Notes*).

Though all the programs described here run effectively on a standard 4MB PowerBook, only a few of them load fully into memory—which means they need to access a hard disk just for reading or saving a file. All the other programs must go to the hard disk at times to load a new program resource (such as a Find dialog box). Once loaded, these resources generally stay in memory for subsequent use, so these programs essentially load by accretion. And some specialized functions (such as spelling checkers), as well as system functions (such as changing fonts), almost always require hard disk access.

ClarisWorks

ClarisWorks version 2.0 (Claris Corporation, 408/727-8227) stands out as the only integrated package—in fact, the only best-selling Macintosh application—that qualifies as PowerBook friendly, although it loads by accretion rather than fully into RAM. ClarisWorks handles word processing, flat-file database management, spreadsheets, telecommunications, and graphics.

ClarisWorks does need the hard disk to perform spelling checks and to load occasional resources. If the partition is set to 2000K (2MB), ClarisWorks has space

to load more completely by accretion (the standard partition runs 800K to 950K). Through its file translators, ClarisWorks can comfortably coexist with many standard Macintosh applications. While each ClarisWorks component can't boast the vast feature set of a dedicated program, you probably won't miss those features for normal work. But at $299 ($200 street price) ClarisWorks costs enough that you might want to consider some cheaper alternatives.

Word Processing

For word processing, you have a wide choice of PowerBook-friendly software. Two programs load by accretion: the $69.95 WriteNow, (sold by WordStar International, 415/382-8000, 800/227-5609), and the $150 Nisus Compact (sold by Nisus Software, 619/481-1477, 800/922-2993). I prefer Nisus Compact, since it loads its working documents into memory as well; WriteNow does not always do this. As a result, Nisus Compact needs more RAM (499K) than WriteNow does (325K). Nisus Compact can also work in conjunction with its full-featured sibling, Nisus; they share the same files and operational interface, so you can switch between the two effortlessly, a major advantage.

For many situations you may not need a complete word processor. Every PowerBook comes with a very simple editor: TeachText. Its price is right, but TeachText doesn't have *any* amenities. For a far more flexible little editor, try miniWriter, which runs as a desk accessory (put it in the Apple Menu Items folder in the System Folder). Unlike TeachText, miniWriter can search for text, insert one document into another, and calculate character and word counts; its ability to change quote marks and line lengths makes it an ideal adjunct to a telecommunications program. What's more, miniWriter fits in only 20K of RAM, 38K on disk; it's available as $12 shareware from user groups and from Maitreya Design, P.O. Box 12085, Eugene, OR 97440.

Microsoft Word goes to the hard disk frequently, so it isn't PowerBook friendly. Word 5.1 does offer a stripped-down installation option for PowerBooks, but this option doesn't reduce the RAM requirement or disk activity. You can run Word from a RAM disk. Or you can use the smaller Word 4.0, which gives you the apparent option of loading the entire program into memory (in Preferences, under the Edit menu with Full Menus selected); in fact, this option simply permits loading by accretion. Although it uses the same file format, Word 4.0 works quite differently from Word 5 or 5.1, so you could just as well use a different word processor. ClarisWorks can read and write Word files. WriteNow can read Word files and write RTF files that Word can read. Nis-

continues

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MINIMIZING HARD DISK USAGE

If you want your PowerBook to be ready nearly instantly and you don't have enough RAM for a RAM disk, try these tips.

1. Analyze your software for hard disk usage. A program that displays disk reads and writes in the menu bar—such as Connectix PowerBook Utilities (CPU), Norton Utilities for the Macintosh (not the Norton Essentials for the PowerBook), or the freeware program InUse—makes the analysis much easier. Run your software, open files, and test different memory sizes to determine what minimizes hard disk usage. Although there is no systematic way to force the entire program into memory, setting a larger memory partition in the program's Get Info window sometimes helps.

2. Every application needs some of the System's resources from time to time. You can minimize the need to retrieve System resources from the hard disk by opening a document containing all the font styles and sizes you need; the System automatically keeps those fonts and sizes in a memory cache. Also, turn off the sound to avoid the need to load sound resources.

3. Turn off extensions that trigger an action, such as alarm clock programs.

4. Regardless of the software you use, you can reduce hard disk access and save some time and battery power if you keep the PowerBook connected to AC power while you open the programs and files you need, and then put the PowerBook to sleep. Then it's ready to go on battery power; you simply wake it up and start working. If you primarily use a single program or a small group of files, you can automate the process by putting the appropriate applications or documents—or their aliases—in the Startup Items folder inside the System Folder.

us Compact can read and write Word files only with Claris translators that do not come with the program.

Databases

Among the full-featured database programs, only Panorama from ProVue Development Corporation ($395; 714/892-8199, 800/966-7878) loads both program and database files completely into memory—making it quite fast. The recommended minimum 976K memory size supports more than 6000 address book–style entries.

The ClarisWorks database follows FileMaker Pro in its general design, but ClarisWorks cannot read or write FileMaker files; you have to use an interchange file format as an intermediary. DIF works best for interchange because it can preserve the field names.

Spreadsheets

The big spreadsheet programs—Microsoft Excel and Lotus 1-2-3—boast too many bells and whistles to be PowerBook friendly. The ClarisWorks spreadsheet can read and write the Excel 3.0 file format; Claris claims to be developing an Excel 4.0 translator. Incidentally, if you want to save files in an alternative format, you have to specify that format every time you save a file; ClarisWorks will not remember your file-type preference.

BiPlane Deluxe (Night Diamonds Software, 714/842-2492) promises to be the best PowerBook alternative to Excel. The $149 program will use Excel 4.0 as its native file format (not yet functional in the prerelease version I tried), and it will load fully into memory. It needs less than 500K of RAM to run, compared with 2048K for Excel (of course, Excel has many more features). The previous version, BiPlane 2.07 ($99 shareware), is still available from user groups, but you can get it with the printed manual and online help directly from Night Diamonds for $60. BiPlane 2 can read and write SYLK files for interchange with Excel; BiPlane 2 neither reads nor writes Excel native files.

Communications

Many small-scale telecommunications programs do a good job on a PowerBook. ZTerm, a $30 shareware program from David P. Alverson (Alverson Software, 5635 Cross Creek Ct., Mason, OH 45040-2448), deserves its wide popularity. However, I recommend Message Mover, an $89.95 program from Seaquest Software (503/531-0252). Although the two programs take up the same amount of disk space (200K) and RAM (450K), the more modern Message Mover includes valuable file-transfer tools that are useful for any communications program that supports the Communications Toolbox.

Graphics

For a paint program, the clear choice is DeskPaint, from Zedcor (602/881-8101), a full-power bitmap graphics program

continues

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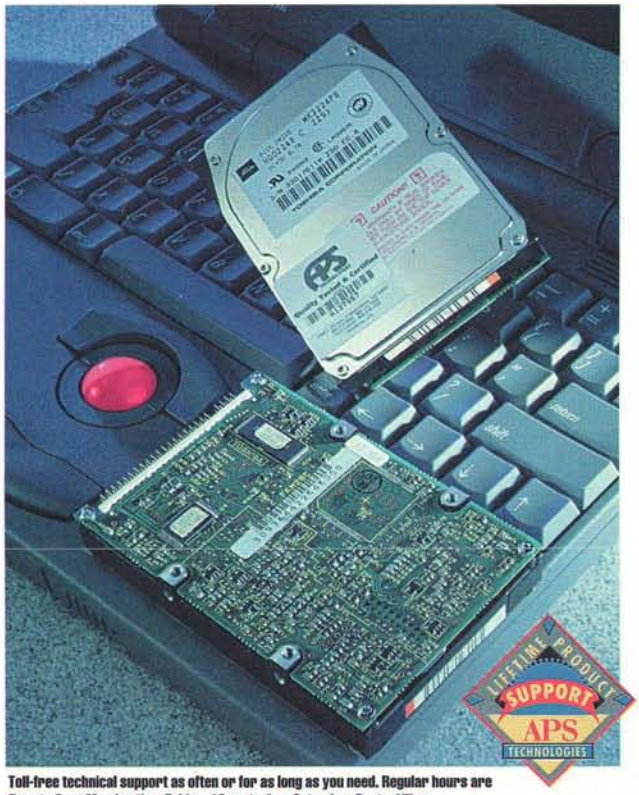

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that supports a wide range of printing resolutions, file types, and up to 24-bit color. Once loaded, it never needs the hard disk, except to access images; it will work with 512K of RAM, but the publisher recommends 1MB (for monochrome) or 2MB (for color).

You can get DeskPaint—along with its object-drawing companion, DeskDraw—for a bargain $29.95. DeskDraw offers a pretty standard set of drawing features comparable to early versions of MacDraw. DeskDraw also loads fully into memory and can save in a PICT format that MacDraw can read and write and Aldus FreeHand can read but not write (Adobe Illustrator cannot do either). DeskDraw requires a minimum 512K of RAM, but 1MB is preferred.

Other Strategies

For programs that may be unwieldy or impractical to run on a Power Book, such as Aldus PageMaker or QuarkXPress, a new technique may help. Instead of running the original program, you can create a display file that faithfully shows the original page images on your PowerBook screen. Common Ground from No Hands Software (415/321-7340, 800/598-3821) and Adobe Acrobat from Adobe Systems (415/961-4400, 800/833-6687) both create output files only; you can search and copy text in a Common Ground or Acrobat file, but you cannot edit the file.

The Future

The ideal program would be configurable to run optimally on both desktop Macs and PowerBooks. The PowerBook version would keep only the core features and load fully into memory; both versions would use the same file format. So far, Nisus and Nisus Compact come the closest to doing this. But the coming revolution in software will make such modular programs more practical. Pink, the new operating system from Taligent (the Apple-IBM joint venture), and Cairo, the new Windows operating system from Microsoft, both feature document-oriented computing. Applications as we know them today will eventually be replaced by tools of varying capabilities that will all be able to create and edit the same documents; a simpler tool for a portable computer could leave out many bells and whistles in favor of speed and efficiency.

Until such products arrive, we are forced to search out the most PowerBook-friendly software we can find. **m**

CARY LU is a *Macworld* contributing editor and author of *The Apple Macintosh Book* (Microsoft Press, 1992).

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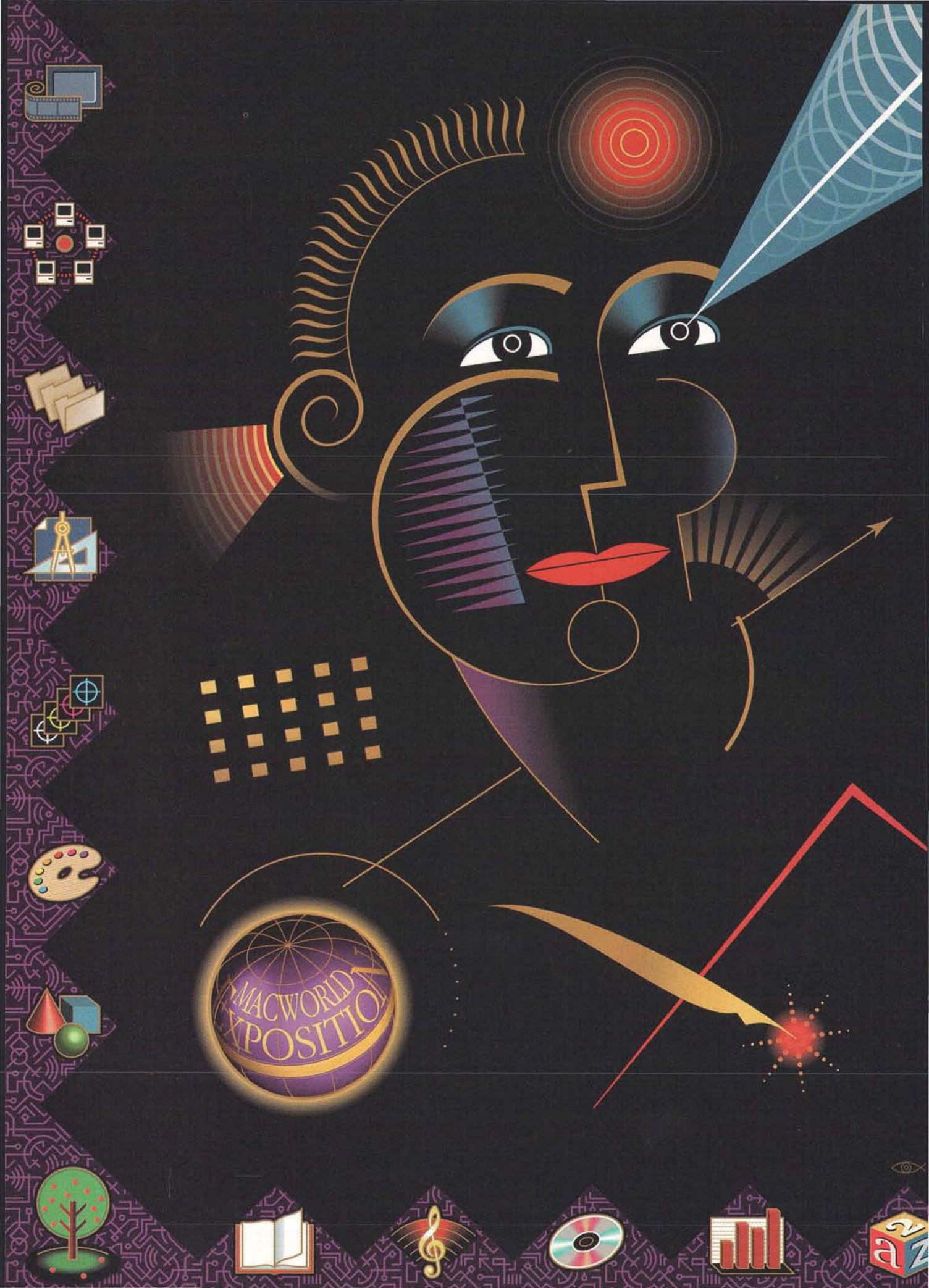
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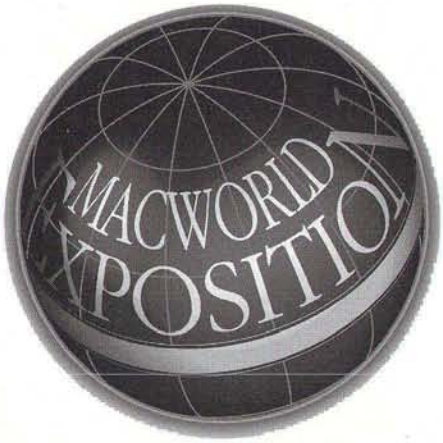

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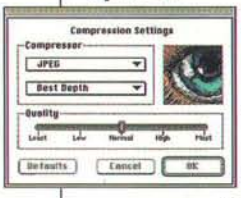

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BY DAVID POGUE

Public Utilities II

The annual Desktop Critic shareware pageant

YOU KNOW WHAT SHAREware is, right? It's the 30,000 Macintosh programs on America Online or CompuServe that you get via modem for free. If you wind up using one regularly, the honor system compels you to mail the author a check for $15 or $20. In return, you're sometimes sent a manual or a fuller-featured version of the software.

When I've been playing with too much of this stuff, I sometimes dream of a world where everything works like shareware. Grab a Budget Gourmet dinner, gratis, from the grocery; if you mail in your money, they send you the microwave instructions. Or test-drive the '94 Civic for two weeks—if you send in your check, Honda sends you the brake pedal. Hey, I know! How 'bout a shareware government? Try the new elected officials for 30 days; if you decide to keep them, you pay your taxes.

Anyway, two October issues ago, I slogged through meg upon meg of this home-cooked code and crowned the cream of the cream. Since not everybody gets paid to peruse programs by the pound, I thought it'd be worth another look to see what's up(loaded).

Apollo

One utility I've been using changes the Mac monitor's color setting automatically for each program (black-and-white for WriteNow, 24-bit color for Photoshop, and so on). Another opens a specified default document every time you launch a program. There's also a utility that can launch a group of related documents and programs all at once. Another can autohide one running program as you switch to another, so you're saved from drowning in a sea of window clutter. Another utility includes a keyboard shortcut for switching between programs.

Last, there's a utility that lists your favorite programs, documents, folders, desk accessories, and even control panels as a menu. It works exactly like the commercial programs On Cue II and Hand-Off II: anything you choose from this menu gets opened instantly, without any folder-foraging on your part.

As David Letterman used to say, you can probably see the punchline coming up Sixth Avenue: these are all actually *one* program. It's Apollo, the ultimate launcher. It's polished, it works in System 6 and 7, and the asking price is $30. My advice: grab it before it gets gobbled up by some software company that knows a $200 product when it sees one. (Modemless? Then send $40 to Jeremy Roussak, 88 Oxhey Ave., Oxhey, Watford, WD1 4HA, England.)

Extensions Manager 2.0

Ricardo Batista's program started out as just another INIT manager—as the Mac starts up, you press the spacebar, and you're offered a choice of which control panels and extensions you want to load. That kind of control is essential when you're trying to solve an extension conflict by restarting repeatedly. Like its commercial rivals, Extensions Manager lets you create sets of extensions that can be switched on or off in one fell swoop. But unlike the commercial ones, Extensions Manager is free.

Version 2.0 adds two novel features. First, if you use System 7.1, Extensions Manager lets you choose which fonts you want installed as the Mac starts up. (In fact, it also lets you turn on and off Apple menu items, Chooser extensions, and items in the Startup Items folder!) And second—O come, all ye PowerBook faithful—the program senses if you're connected to a network. If not, it automatically shuts off all those RAM and battery-depleting network extensions and control panels. The manual is pretty opaque, but the software is one clever piece of work.

Sound-Trecker 1.0

Do me one favor. Remember that you first read about Sound-Trecker right here.

Until now, the Macintosh has had two music file formats: digitized and MIDI. Digitized sounds—like the ones you record with your Mac's microphone—sound great, but they take up a huge amount of disk space. MIDI files are compact—they store only note data—but you have to have a synthesizer to hear them.

But a MOD file, popular on the Amiga computer, contains the note data *and* small sampled instrument sounds. The result is rich, live-sounding, orchestrated music from a small file on the disk. A two-minute song uses 98K of disk space (the equivalent Mac-sound file: 2600K). The really golden part is that, because very little Mac processing is involved, a MOD-file player can merrily jam in the background while you word process.

Sound-Trecker is the first MOD-file player for the Mac (Frank Seide, $30 requested). It lets you change keys and tempos independently, and it gives you four tracks to play with (make the drums louder, for example). You can even create a jukebox of songs to play in sequence. Both the program and 300 ready-to-play pop-music MOD files await on America Online. (Particularly good are the "Peter Gunn" and "Hill Street Blues" files.)

continues

SmartKeys 2.1

The three rules for making Mac documents look typeset all fly in the face of typing-instructor dicta: Don't type two spaces after a period; don't use the quote key to make quotation marks; don't use two hyphens as a dash.

Maurice Volaski's SmartKeys control panel corrects your carelessness automatically as you type, obliterating your second space after a period, dashifying your hyphens, and curlifying your straight quotes. (If you're into negative reinforcement, you can have it beep each time you commit such an offense.) SmartKeys can also create ligatures (joining your *f* and *i* into one *fi*, for example). It can type a period (.) or comma (,)—and not a less than (<) or greater than (>)—when you press shift-period or shift-comma. And, my favorite, it can correct FAst TYpist SYndrome, where you accidentally capitalize the second letter of a capitalized word.

You can turn off any of these watchdogs, either permanently or on an individual-case basis (as when you really do want a < or > symbol). Good software, good manual—and it's free. (Still no modem? Send disk and prepaid return mailer to Maurice Volaski, 8201 Henry Ave. #J23, Philadelphia, PA 19128.)

File Sharing Improvement Doohickeys 1.0

Jim Luther is an Apple staffer working overtime to better our world. His offering is a free set of three—well, yes—doohickeys that make using System 7's file-sharing feature more convenient.

There's a pair of tiny programs that let you turn your Mac's file sharing on or off when you're seated at some other Mac on the network. There's a control panel (for System 7.1 only) that lets you control or disable the various AppleShare alert messages (such as "The file server is closing down in *x* minute(s)"), prevents the storing of your password, and more.

In my estimation, the most useful Doohickey is UnmountIt. When you drag a disk icon onto UnmountIt's icon, UnmountIt unmounts it (removes its icon from the desktop). Big woop, you say? Guess you never tried to eject a SyQuest cartridge while File Sharing is turned on. Without UnmountIt, you can't.

ApplWindows 2.0

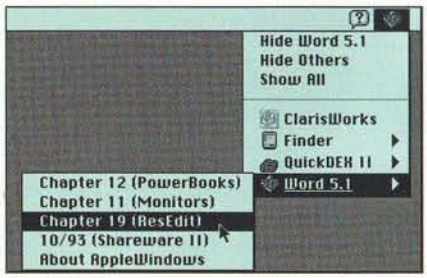
In System 7, you're supposed to use the application menu at the right side of the menu bar to switch from one running program to another. ApplWindows makes that menu hierarchical; it lets you jump not just to a specific program, but to a particular window in it. This bit of usefulness is brought to us, free, by Hiro Yamamoto, author of the famous Super Boomerang file-management utility.

Version 2.0 takes that principle and runs—nay, marathons—with it. You can program ApplWindows to hide all other programs' windows as you switch to another program; to make its enhanced application menu pop up anywhere on the screen; and to switch from one running program to another at the touch of a key.

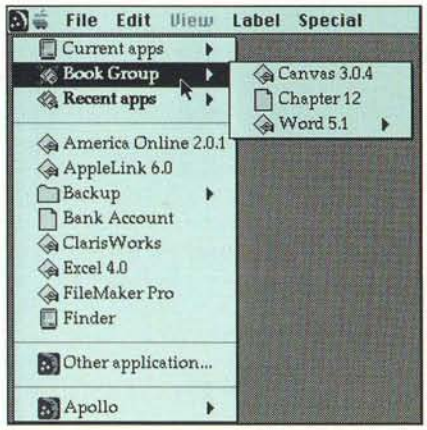
Connectix Enabler Patch

This is really more of a public-service announcement than a review. Connectix, the memory-software company, discovered a bug in the enabler files that recent Mac models require to run (latest PowerBooks and Duos, Centris, IIvx, and so on). This bug is responsible for sporadic system crashes.

After consultation with Apple, Connectix has released a free, tiny, benevolent system extension. When installed in your System Folder, it corrects the enabler bug. (At press time Apple was preparing to release its Hardware System Update 2.0 extension, which fixes the same bug. It should be available as you read this.)



ApplWindows Menu Hiro Yamamoto's ApplWindows makes your application menu hierarchical, so that you can jump directly to a specific open window of any program (including the Finder).



It's Launch Time Apollo lists your favorite files in your favorite font, and launches any of them (or, as in this illustration, any group of them) instantly.

The Upshot

Sure, the shareware system has its freeloaders; but at least enough people send in the requested payments that the stream of powerful, well-designed Mac programs continues to flow.

I have to admit the idea of shareware is attractive. I know! Maybe next month I'll publish only the first three paragraphs of this column. If you decide to keep reading, mail me three cents, cashier's check preferred. **m**

Contributing editor DAVID POGUE is the coauthor of *Macworld Macintosh Secrets* (IDG Books Worldwide, 1993), which comes with 8.5MB of commercial and shareware programs.

SHAREWARE VERSUS COMMERCIALWARE

Frequent visitors to America Online recently ran across a series of messages about shareware in the *Macworld* area. It began with a reader's suggestion to *Macworld:* "I propose that you include shareware in *all* of your product comparisons," he wrote. "Commercial software vendors should be given the message loud and clear: Shareware authors are doing better work and selling it cheap." As you'd expect, this message had its supporters. "Some of the brightest gems in my collection are shareware," agreed one.

But one reader dissented. "It's a mistake to aggrandize shareware," she wrote. "Some of what's posted is unfinished. [And] there is more to a program than the program itself. Maintenance and support should be considered."

Support, schmupport, somebody retorted: "I have gotten amazingly fast and thorough responses from shareware authors when I had a question. In contrast, I have asked the very visible publisher of a commercial program one simple question, and failed to get a response."

True enough, shareware doesn't come with packaging, marketing, upgrades in the mail, or a toll-free support line. But that's just the point: because the programmer doesn't pay for any of that (nor manpower, nor shipping), you get no-frills, very inexpensive software. Above all, the shareware system means no ripoffs; by the time you cut the check, you already know what you're buying.

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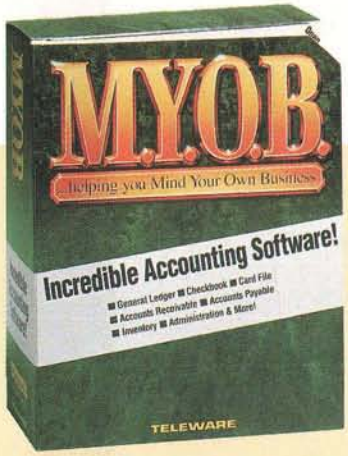

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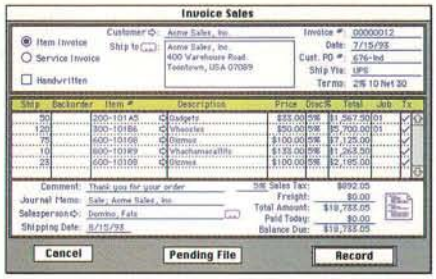

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THE ICONOCLAST

BY STEVEN LEVY

Geek House

Apple and Microsoft's living-room war may not be over

March 17, 1988, seems a long time ago. George Bush was just getting used to the presidency. The Mac II had been out for less than a year. Millions of Americans slept peacefully, unaware of Rush Limbaugh, Billy Ray Cyrus, and Zoë Baird. It was also the day that Apple Computer's lawyers dragged their bankers boxes over to U.S. District Court and sued Microsoft and Hewlett-Packard. The claim was that Microsoft's Windows 2.03 and HP's NewWave system violated Apple's copyright on the "audiovisual works" of the Lisa and Macintosh interfaces. (Later Apple amended the complaint to include Windows 3.0.)

The most famous lawsuit of the personal computer age had begun. Lawyers would bill millions of dollars; executives, managers, and engineers would spend days in deposition; and countless trees would sacrifice their pulp for briefs and transcripts. Years would pass as the rulings trickled in. It was a high-tech equivalent of the marathon litigation Dickens described in *Bleak House*. Call it *Geek House*.

Apple planned to prove its case by a jury trial, but Microsoft's motions, and Apple's own briefs and responses, crept through the process, requiring one ruling after another. (For brevity, I'll ignore the HP part of the suit.) Twice the judge in charge of the case bailed out and a reliever was called in from the judicial bull pen.

At first Apple was swaggering, and people were whispering about how Microsoft might be ruined if it lost a jury trial. Then the tide turned. Microsoft began building a big lead. Judges kept whittling down Apple's claims, until there were the barest grounds for complaint. By the time Apple got around to estimating its damages—first it guessed $4.4 billion in damages, then upped the ante to $5.5 billion—Microsoft was on a roll.

Eventually, in April 1992, Judge Vaughn Walker ruled in Microsoft's favor. Apple asked for and was granted a reconsideration. But a few months later, Walker reaffirmed his decision, and in June 1993, he dismissed the claims of infringement. Microsoft had won. Apple had lost.

It should have been big news. But it wasn't. I suspect the Mac community was too exhausted by the whole affair to devote much mind-share to it. Yet buried in the briefs, the rulings, the depositions of *Apple v. Microsoft* are issues that affect every user of personal computers. It all has to do with software copyrights, consistency in software, and living rooms.

See Me, Feel Me

Let's go back to a spontaneous debate held even before Apple filed its suit. It was February 1987, at analyst Esther Dyson's annual high-tech summit. A panel of software developers discussed the idea of consistency in software. Consistency, of course, is important if people are ever going to feel comfortable handling more than a single application on a computer. The idea behind Macintosh was to lock in consistency by providing a standard environment—a living room for your mind where no one ever moves the furniture.

A panelist complained that copyright issues—whether someone can own a given look-and-feel of an operating system—might hamper progress toward this consistency. If someone claimed to own a layout for a virtual living room, wouldn't things get messy when other companies, unable to use that plan, rearranged the furniture? Wouldn't it condemn users to a lifetime of stumbling around looking for a place to sit?

Larry Tesler, Apple Computer's VP of advanced technology, didn't think so. He claimed that copyright laws can promote *more* consistency. "When someone comes up with a very good and popular look-and-feel, for example, as we've done with the Macintosh, then they can make that available by licensing to other people. . . . We find it a way to encourage consistency, and that's why all the Macintosh applications work the same way."

At that point Bill Gates, who was in the audience, could not contain himself. "There's no control of look-and-feel," he charged. "I don't know anybody who has asserted that things like drop-down menus and dialog boxes and just those general form-type aspects are subject to this look-and-feel stuff. Certainly it's our view that the consistency of user interface has become a very spreading thing and that it's open, generic technology. All of those approaches—how you click on bars, and certainly all those user-interface techniques and windows—there's absolutely no restriction in any way on how people use those in their applications."

The Living-Room War

As it turned out, the Apple suit didn't take a clear shot on the look-and-feel issue. A lot of the suit concerned the breadth of a 1985 license agreement between Apple and Microsoft that granted the latter permission to use Macintosh and Lisa interface elements in the first version of Windows. And then there was the question of how much Apple itself had appropriated from Xerox PARC, which was the first to

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introduce some of the ideas embodied in the Mac and its predecessor, the Lisa.

But for users, at least, the heart of the debate involves this issue of consistency, and here let us return to the metaphorical living room. While both sides agreed that a well-designed and consistent living room is good to have, each contended that its own victory would assure people access to predictably situated sofas. Apple insisted that if it couldn't protect the Mac interface, there would be little incentive for any interior decorator to devise new schemes for living-room arrangements. The fair thing, said Apple, is to reward the genius who spends time and talent to discover that it's a good idea for an easy chair to face the boob tube. That person should then own that solution to the chair-television conundrum, and if someone else likes it, he or she can license the arrangement from the copyright holder.

But the fact is, when Apple devised the user-interface elements in question, it relied not only on its designers' innovative ideas, but also on extensive user testing. Apple plucked computer virgins from the ranks of its new employees, gave them alternative solutions to interface problems, and noted what worked. As Bill Atkinson, as big a force as any in devising Apple's crown interface jewels, says, "There were aesthetic considerations [in interface design], but when we did something that worked well, we would keep that. The things that were good solutions stuck."

Thus the common-sense nature of Apple's solutions to the problems of graphical interface—the nigh inevitability of its approach—led Judge Walker to slap down Apple's case. His decisions suggest that the only elements of an interface worthy of protection are those with a distinctive, artistic visual feel.

Take one of the very first of the 189 elements that Apple considered an infringement on its rights, Element A1: "Overlapping rectangular windows in front of a muted background pattern." Windows has something fitting that description—but it's not *exactly* the same. Walker notes that "the only feature of the overlapping windows in the Macintosh Finder and Lisa Desktop which reflects any separate artistic expression is the drop shadow that appears on the right and lower edges of the overlapping windows in these works." Because Windows had no drop shadow and was therefore not "virtually identical," there was no infringement. And so it went, element by element, until Apple had no case left at all.

Art and the Interface

The judge's decision means that, by Microsoft's reasoning, the users win. And I agree. Is it fair to deny the world Barcaloungers facing the TV? This way users won't be held hostage to a particular company should that company chance upon the most logical solution to a functional interface problem.

Still, something about Judge Walker's decision bothers me. I do believe the Macintosh interface is, in toto, a work of art. Like any such creation, it is more than the sum of its parts; breaking it into its elements belittles the marvelous gestalt that makes using the Mac such a uniformly pleasant experience. If Apple has any complaint, it is that Judge Walker didn't acknowledge this, choosing to gauge infringement on a "virtually identical" standard. If the case had gone to a jury, it might have been blown away by all the things that Windows obviously owes to the Mac interface, and the outcome could have been different.

My sympathy for Apple is mitigated by users' needs for consistency and the company's own behavior. After spending time and money to develop a superior interface, rather than spreading it as widely as possible, Apple used its advantage to levy premium tariffs on those of us who came to love it. Instead of licensing its system freely, as Tesler suggested companies would, Apple sued those who built on its ideas.

As a result, the Mac interface became associated solely with Apple, and those in the corporate world deemed it weird, nonstandard, vaguely subversive. Only when Microsoft pushed its derivative and somewhat spastic Windows 3.0 did the philosophy of a consistent, easy-to-use interface gain broad acceptance. So even if Apple had a valid gripe that Microsoft swiped its gestalt, it turned out that Microsoft's pale homage was far more effective in spreading the Macintosh gospel than Apple's own greed-driven efforts.

The Suit That Won't Die

The time is long past to retire this case, for the sake of users and both companies. Unfortunately, Chris Ottenweller, Apple's outside counsel, says, "We intend to pursue an appeal very vigorously. If the appeal can be moved along expeditiously, we hope to have a ruling within 12 to 15 months." Right. And if *that* ruling is favorable, then more rulings and delays will surely follow. Then a jury trial, followed by more appeals, more briefs, and more rulings. And appeals on *those* rulings. Long after the interface has given way to virtual reality goggles, *Apple v. Microsoft* may still be alive and kicking. **m**

STEVEN LEVY's most recent book is *Artificial Life: The Quest for a New Creation* (Pantheon, 1992).

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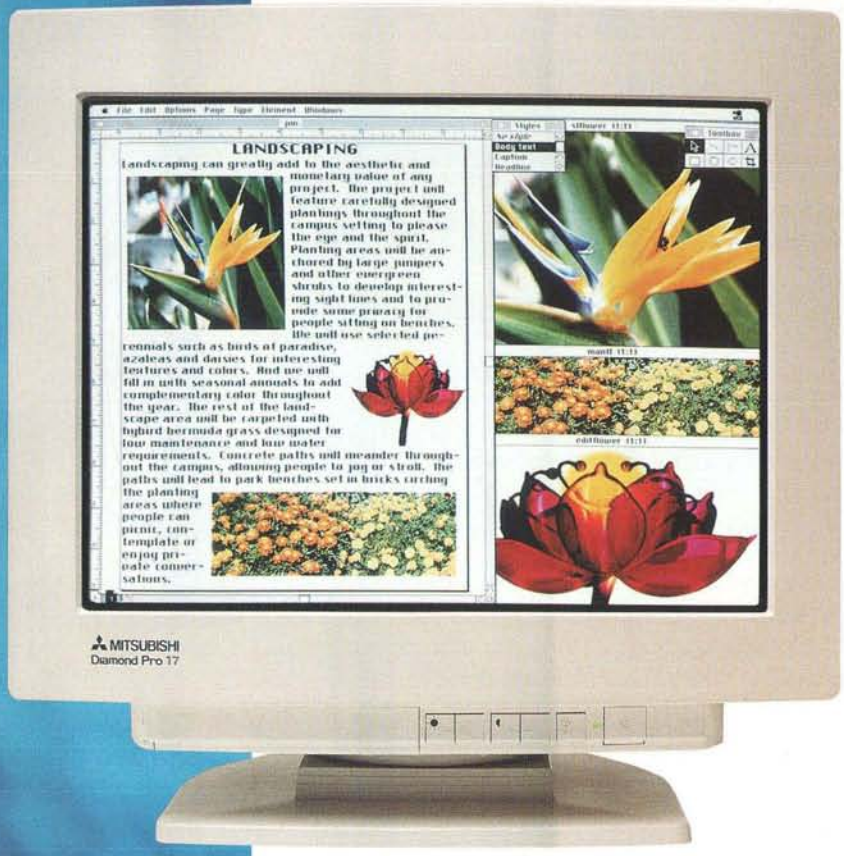

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CONSPICUOUS CONSUMER

BY DEBORAH BRANSCUM

Desperately Seeking Macs

Why are machines still in short supply?

APPLE DEALER M. DENDY Young would like to get his hands on a Centris 650 or a Quadra 800 but says they're hard to come by. Young should know—he founded Falcon Microsystems, a $180-million company that sells Apple, Silicon Graphics, and Dell computer products to the federal government.

Young, like other dealers, confirms what many frustrated Apple customers already know: limited supplies of some new and not-so-new Apple products have become routine. As of mid-July, dealers across the country reported shortages of the LC III, Centris 650, and Quadra 800. They also said Mac configurations with 230MB hard drives were difficult to find, and that a shortage of certain 14-inch color monitors was expected.

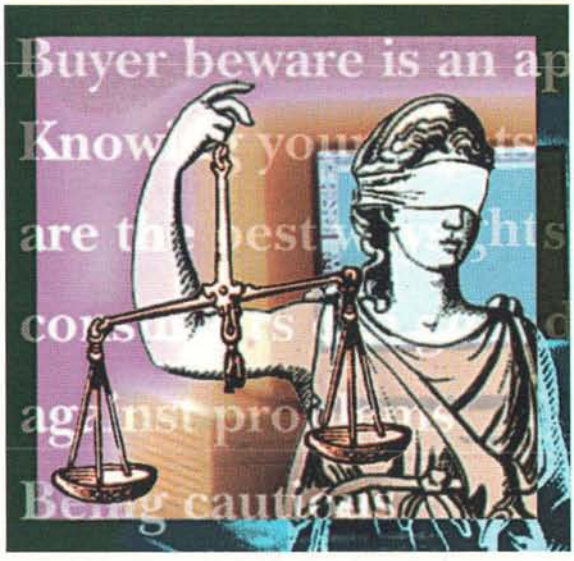
"There have been shortages from Apple for the last ten years," says Young, who runs his business exclusively using Macintoshes. "It seems to be a fairly consistent problem with Apple. They have a hard time forecasting exactly what quantity of products they are going to sell and having that quantity available when they need it."

At press time, Steve Roadhouse, an Apple-business-development manager for Dallas-based CompuCom, says his company faces back orders on the Centris 650 8/230 with Ethernet; on the Express Modem for the Duo; and even on the Duo battery charger. Several dealers say logicboard upgrades to the LC III and Centris 650 are also in short supply. (Apple gives priority to shipping new systems over upgrades, so owners of older machines can always expect a lag between an upgrade's announcement and its availability.)

New Crystal Ball Needed

Computer shortages have been an industrywide problem for the past year; a price war in the PC market helped spur demand that none of the major companies could fully meet. IBM and Compaq as well as Apple made headlines because of back orders for their most popular products, particularly notebook computers. Problems in manufacturing active matrix displays contributed to the eight-month-plus PowerBook 180 shortage, but that does not explain Apple's continuing struggle to deliver its other products.

At press time, Apple executives were unavailable to comment on why shortages continue, although a company representative and some dealers confirmed that product supplies have recently improved overall. The introduction of the 180c was expected to help ease the 180 shortage by diverting some demand to the new machine. And Tom Santos, owner of San Francisco's MacAdam, predicted that the rebate program announced in July will help solve the LC III shortage problem. "With the rebate offer the LC III is only $100 less than a Centris 610, so everybody's going to a 610," he says.



The improvement is certainly welcome, but dealers I spoke to don't anticipate an immediate, lasting change. "We have a backlog of about $6.5 million in orders," says Young. He and other sources pointed to Apple's faulty forecasting as the primary reason for product shortages. Some question exists as to whether product shortages can ever be avoided as long as Apple bases its manufacturing on forecasts of product orders rather than on actual product orders. Back orders develop when the projections are wrong, then frantic resellers might order two or three times as many products as they actually need in hopes of getting new products to their customers.

To be fair, even actual orders can be misleading about the popularity of a product. A case in point is the Apple Basic Color Display, an inexpensive ($329) VGA monitor that sources say many schools snapped up—then returned to dealers in disappointment. The 14-inch Apple Basic Color Display has a 0.39mm dot pitch and a vertical scan rate of 60Hz, while the 14-inch Macintosh Color Display has a 0.26mm dot pitch and a vertical scan rate of 66.7Hz. New Macintosh users might be happy with the Basic Color Display, if they have never used anything else. On paper the differences between the Basic Color Display and the higher-quality and higher-cost ($539)Trinitron-based Macintosh Color Display seem minor, but several educators told me there was no real comparison.

Apple "produced the Basic Color Monitor, and then they let the educational channel return them, and now they have a huge warehouse of Basic Color Monitors," according to one dealer, who asked not to be identified. As a result, a number of dealers say they have been warned to expect a shortage of the Macintosh Color Display as educators turn to that model instead.

Purchase Strategies

According to Apple dealers, there's no quick and easy way to get your hands on products that are in short supply. Still, there are four approaches that may help you cope.

1. Emphasize the importance of your company or project to Apple. This strategy works best for Apple's largest customers, because the company's strategic

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allocation policy offers key Mac sites and projects access to products that may otherwise be in short supply. Mark Share provides one example of this strategy in action. Share, director of educational technology for the Scottsdale, Arizona, public schools, received 110 LC 520s the same week the education machines were announced. Apple clearly wanted to help Share, who planned to use the computers in a new model school. It probably helped that Share's school district has $16 million to spend on educational technology over the next four years. Under the circumstances, it's not surprising that Apple moved quickly to get Share his computers.

2. Emphasize the importance of your company or project to a computer dealer. Dealers who espouse a first-come-first-served policy sometimes put established customers in line ahead of new customers for hard-to-get products, particularly if those customers generally make large purchases.

3. Call around. When a new Apple product is in short supply, you may be able to locate one by calling several possible sources. In the face of shortages, products are doled out sparingly to dealers. One dealer may have only one new Mac model for display while another has two or three for sale.

Moreover, Apple now sells directly to its largest customers, to educators, and by mail. It also sells through traditional computer dealers; and through 2200 consumer retailers such as Montgomery Ward, Circuit City, and Wal-Mart. A certain number of machines are earmarked for different distribution channels based on company forecasts, which are often wrong, according to dealers. The upshot is that one channel may have machines while another faces shortages.

Consider the StyleWriter II. Some computer dealers had very few StyleWriter II's to sell for some time after the product was introduced in January, while general retailers seemed to have the printer in stock. According to David Polzine, assistant manager of ComputerWare in San Francisco, his store advised several customers to buy the printer at Montgomery Ward or Circuit City, since ComputerWare didn't know when Apple would provide the new product.

A more current case is the LC III and the Performa 450, which are virtually identical computers. The LC III, sold by computer dealers, comes with either an 80MB or a 230MB drive; modems and monitors must be purchased separately. The Performa 450 comes bundled with a send-only fax modem; a 14-inch, 29mm-dot-pitch color monitor; a 120MB hard drive; and several software packages. In mid-July, five months after its introduction, the LC III was still in short supply at computer dealers. But retailers such as Sears seemed to have plenty of Performa 450s, according to stores *Macworld* contacted. Retailers are charging about $1799 for the complete package; a similar configuration from computer dealers but with a send/receive fax modem is priced at $1947 from ComputerWare in San Francisco. LC III prices vary by store and region, but it seems clear the Performa 450 is not only more available but also less expensive.

4. Be flexible; older Macintoshes may meet your needs, or third parties may offer alternative products. "If you want a product, you may have to compromise," says Young. "You might find that instead of the Quadra 800, we have the Quadra 950. It costs a little more, but you can have it on an immediate basis." There are no alternatives for PowerBook Duo owners who want to buy Express Modems, because Apple is the only company now selling modems for Duos; owners of other PowerBooks can look to Global Village and other companies for choices if Express Modem shortages continue.

Friendly Advice

In November 1992 Apple faced a backlog of product orders worth an estimated $1 billion. Last January Apple chairman and then-CEO John Sculley predicted that some product shortages would continue through the second half of the year, and so they have.

It's a challenge for any manufacturer to deliver the appropriate number of products, in many models, across several channels. But Apple must somehow respond to its frustrated resellers and their customers. Apple no longer sells CPUs without hard drives, but maybe it should. Then dealers could add hard drives from any number of third parties, instead of explaining to their customers that Apple has a shortage of 230MB drives.

Whatever the approach, Apple must take these shortages seriously. Apple has a very loyal customer base, but to win new market share, it must have machines to sell. And as one ComputerLand dealer told an industry publication last year, "The battle for the desktop is going to be won on availability as much as on price." **m**

Research assistance by PAUL DEVINE.

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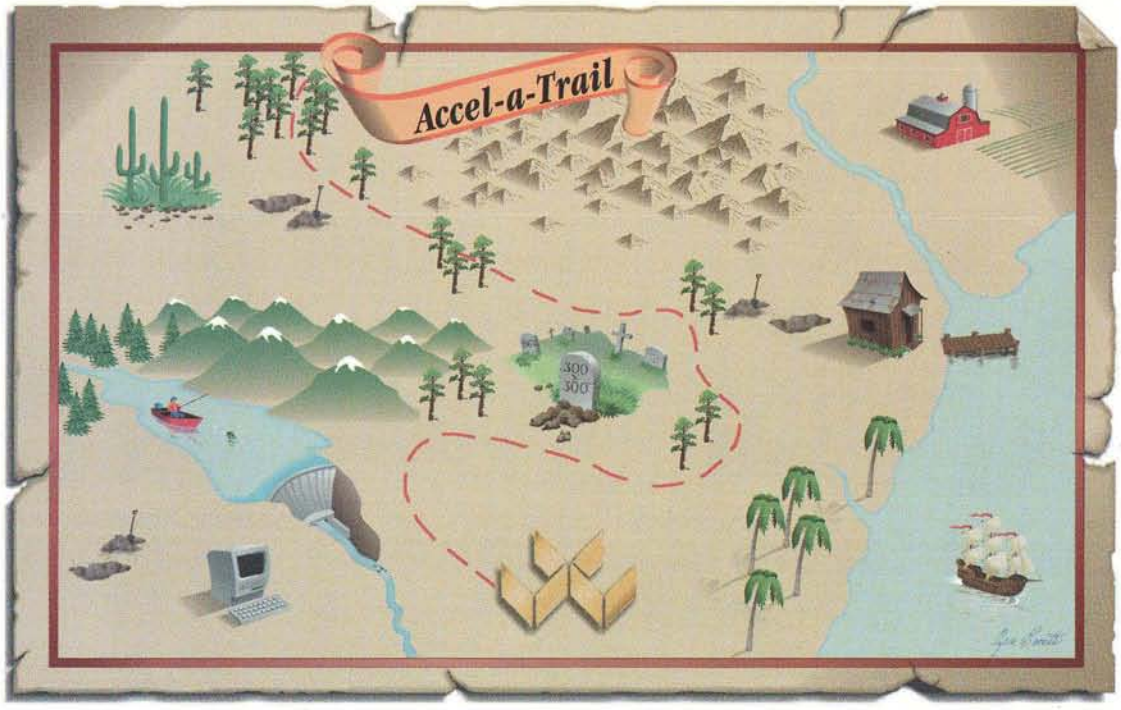

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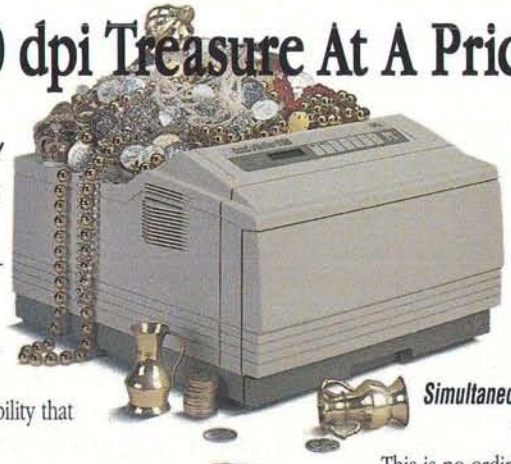

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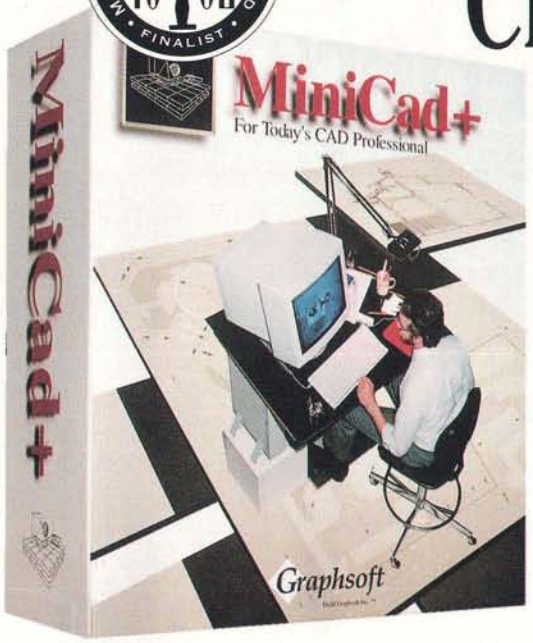
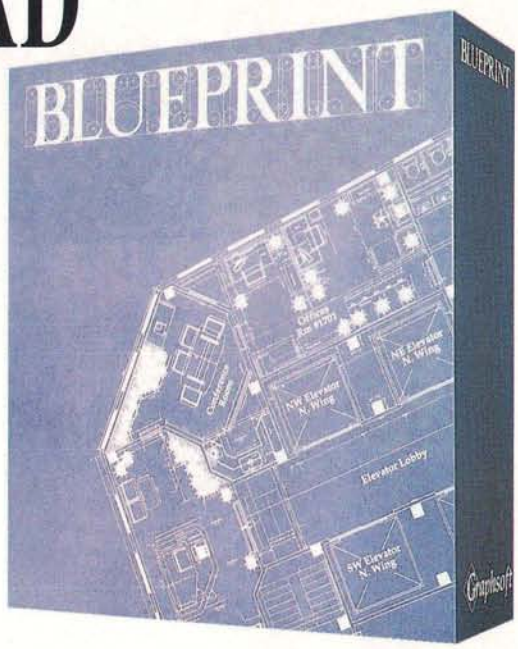
Circle 1 on reader service card

Graphsoft Outruns Claris CAD



For Quality, Power and Price/Performance MiniCad+ and Blueprint Race Ahead!



MiniCad+4 $ 795.00

2D CAD:

- ☐ smart walls
- ☐ Smart Cursor for locating snaps
- ☐ advanced auto-dimensioning
- ☐ editable line styles
- ☐ pan by scroll bars or hand
- ☐ color by object or layer
- ☐ DXF translator - free
- ☐ unlimited layers
- ☐ global symbol editing
- ☐ on-line prompts
- ☐ unlimited drawing space
- ☐ pick-up and put-down attributes
- ☐ selection by properties
- ☐ auto-insert symbols in walls
- ☐ hierarchical symbol library
- ☐ add & subtract surfaces
- ☐ fractional feet and inches option
- ☐ fillets
- ☐ editable fills
- ☐ beziers
- ☐ wall-join
- ☐ chamfers
- ☐ tolerancing
- ☐ unlimited saved views
- ☐ hatching
- ☐ polylines
- ☐ classes
- ☐ export EPSF
- ☐ free Claris CAD translator
- ☐ round wall caps
- ☐ edit inside groups
- ☐ scale by layer

3D CAD:

- ☐ mechanical projections
- ☐ orthogonal or perspective views
- ☐ work in wire-frame or solid
- ☐ walkthrough and flyover tool
- ☐ create 3D view from floorplan
- ☐ sweeps, extrusions & meshes
- ☐ 3D reshape tool
- ☐ roof & slab tools
- ☐ 3D smart cursor
- ☐ auto sectioning
- ☐ multiple view

Integrated Database/Spreadsheet:

- ☐ attach data to graphic objects
- ☐ export reports to text, merge,dif, & sylk
- ☐ familiar spreadsheet interface
- ☐ search or select by field value
- ☐ create default records
- ☐ auto update reports

Programmability:

- ☐ Over 300 powerful routines
- ☐ generate drawings automatically
- ☐ perform engineering analysis
- ☐ no compilation needed
- ☐ read & write text files
- ☐ automate repetitive tasks

Claris CAD $ 899.00

2D CAD:

- ☐ smart walls
- ☐ Graphic Guide for locating snaps
- ☐ advanced auto-dimensioning
- ☐ editable line styles
- ☐ pan by scroll bars
- ☐ color by object only
- ☐ DXF translator - extra charge
- ☐ unlimited layers
- ☐ fillets
- ☐ editable fills
- ☐ beziers
- ☐ wall-join
- ☐ chamfers
- ☐ tolerancing
- ☐ 9 saved views
- ☐ hatching

3D CAD:

none

Integrated Database/Spreadsheet:

none

Programmability:

none

Blueprint 4 $ 295.00

2D CAD:

- ☐ smart walls
- ☐ Smart Cursor for locating snaps
- ☐ advanced auto-dimensioning
- ☐ editable line styles
- ☐ pan by scroll bars or hand
- ☐ color by object or layer
- ☐ DXF translator - free
- ☐ unlimited layers
- ☐ global symbol editing
- ☐ polylines
- ☐ unlimited drawing space
- ☐ file compatible with MiniCad+
- ☐ fractional feet & inches option
- ☐ auto-insert symbols in walls
- ☐ hierarchical symbol library
- ☐ add & subtract surfaces
- ☐ pick-up and put-down attributes
- ☐ fillets
- ☐ editable fills
- ☐ beziers
- ☐ wall-join
- ☐ chamfers
- ☐ tolerancing
- ☐ unlimited saved views
- ☐ hatching
- ☐ on-line prompts
- ☐ export EPSF
- ☐ scale by layer
- ☐ classes
- ☐ round wall caps
- ☐ edit inside groups

Graphsoft wins races by aggressive product improvement year after year. MiniCad+ was the first CAD program on the Macintosh. Since then, our R&D department has never stopped working on MiniCad+ and Blueprint. Graphsoft customers can rely on getting significant upgrades at a reasonable cost which support current technology, new operating systems, and evolving user needs. We've won awards worldwide, and are the top selling Macintosh CAD program in quality-conscious Japan. Our technical support is staffed by professionals who know drafting and design, not just computers. We stand behind our line of products with a 30-day money-back guarantee. Send for a video and trial diskette for MiniCad+ or a tutorial and trial diskette for Blueprint, $19 each. MiniCad+ and Blueprint, the answers you've been looking for.

1988 MacWorld Award -Australian- MiniCad+

1989 MacWorld World Class Award -US- MiniCad+

1990 MacUser Eddy Award -US- MiniCad+

1992 MacWorld Editors Choice Award -US- Blueprint

1992 MacWorld Best CAD Award -Switzerland- MiniCad+

Also from Graphsoft Inc.

Azimuth

The ultimate map creation tool including 9 cartographic projections. Used by **U.S. News & World Report**.

$395.00

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Graphsoft

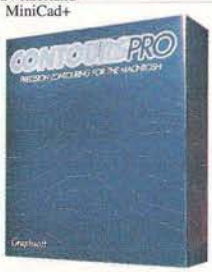
The Macintosh CAD People

Also from Graphsoft Inc.

ContoursPro

Make high-precision survey maps with accuracy and ease. Exports DXF to AutoCAD™ or modeller of choice. "Recommended" says **Cadalyst**!

$495.00



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Circle 46 on reader service card

Editors' Choice

THE BEST PRODUCTS FEATURED IN MACWORLD

Edited by Susan Grant-Marsh

Macworld Editors' Choice is a complete listing of the hardware and software products selected as the best of their type in *Macworld*'s comparative articles through the past year. A ❖ next to a product indicates that we chose more than one product in that category.

Hardware

MONITORS

BLACK-AND-WHITE MONITORS, May 93

Portrait monitor: 15-Inch Gray Scale Portrait Display; Mirror Technologies, 612/633-4450; $399, with video-display board $549.

Two-page monitor: ❖ L-View MultiMode; Sigma Designs, 510/770-0100; $1099, with video-display board $1398. ❖ MD 202 Two Page Display; Mobius Technologies, 510/654-0556; $699, with video-display board $798.

GRAY-SCALE MONITORS, May 93

Portrait monitor: Pivot Display; Radius, 408/434-1010; $849, with video-display board $1148.

Two-page monitor: MultiMode 120, SilverView Pro; Sigma Designs, 510/770-0100; $1099, with video-display board $1299.

COLOR MONITORS, Oct 93

16- and 17-inch: ❖ ErgoView 17; Sigma Designs, 510/770-0100; $1349. ❖ MultiSync 5FG; NEC Technologies, 708/860-9500; $1355 (NEC's estimated dealer price).

NETWORK HARDWARE

HARDWARE ROUTERS, Jul 93

Under $1500: EtherRoute; Compatible Systems, 303/444-9532; base model $1495 (no TCP/IP support).

Between $1500 and $3500: InterRoute/5; Farallon Computing, 510/814-5000; $3299 to $3499.

HIGH-SPEED FAX MODEMS, Oct 93

Teleport Gold and Silver with Global Fax; Global Village Communication, 415/390-8200; Gold $499, Silver $429.

POWERBOOK TOOLS

DUO DOCKING CONNECTORS, Feb 93

PowerLink DeskNet; E-Machines, 503/646-6699; $699.

EXTERNAL HARD DRIVES, Feb 93

❖ Companion 120; APS Technologies, 816/478-8300; $599. ❖ PocketDrive 120MB; La Cie, 503/520-9000; $699.

INTERNAL FAX MODEMS, Feb 93

❖ PowerModem series; PSI, 408/559-8544; $195 to $495. ❖ PowerPort series; Global Village Communication, 415/390-8200; $229 to $499.

SCSI MONOCHROME MONITORS, Feb 93

Power Portrait; Sigma Designs, 510/770-0100; $749.

PRINTERS

PERSONAL PRINTERS, Sep 93

Ink-jet: StyleWriter II; Apple Computer, 408/996-1010; $359.

PostScript laser: TI microLaser Series; Texas Instruments, 512/250-6679; $1199 to $1599.

QuickDraw laser: LaserWriter Select 300; Apple Computer, 408/996-1010; $839.

WORKGROUP PRINTERS, Jan 93

Basic printing: microLaser XL Turbo; Texas Instruments, 512/250-6679; $3649.

High-speed office printing: Pagemarq 20; Compaq Computer Corp., 713/370-0670; $5699.

Duplex printing: LaserJet IIISi; Hewlett-Packard, 800/752-0900; $6995.

COLOR PRINTERS, May 93

Dye-sublimation:

❖ ColorStream/DS; Mitsubishi International, 408/980-1100; $9950. ❖ Phaser IISD Color Printer; Tektronix, 503/682-7377; $9995.

Thermal-wax:

❖ ColorScript 210; QMS, 205/633-4300; $4995. ❖ Personal ColorPoint PSE; Seiko Instruments, 408/922-5800; $2999.

Low-end liquid-ink: HP DeskWriter 550C; Hewlett-Packard, 800/752-0900; $1099.

Midrange liquid-ink: HP PaintJet XL300; Hewlett-Packard, 800/752-0900; $3495.

Solid-ink: Phaser III PXi Color Printer; Tektronix, 503/685-3585; $9995.

SCANNERS

SLIDE SCANNERS, Oct 92

❖ LS-3510AF Film Scanner; Nikon, 516/547-4355; 8-bit unit $9535, 12-bit unit $11,316. ❖ LeafScan 35; Leaf Systems, 508/460-8300; $9995.

SYSTEMS/STORAGE

CD-ROM DRIVES, Oct 92

High-performance: InterSect CDR-74; NEC Technologies, 708/860-9500; $712.

Budget choice: Mirror CD-ROM Drive; Mirror Technologies, 612/633-4450; $599.

DOUBLE-SPEED CD-ROM DRIVES, Jul 93

Sheer speed: Pioneer DRM-604X; Pioneer, 408/988-1702; $1795.

Overall value: AppleCD 300; Apple Computer, 408/996-1010; $599.

Budget choice: NEC MultiSpin 38; NEC Technologies, 708/860-9500; $465.

HIGH-SPEED HARD DRIVES, Aug 93

1GB drives: ❖ Edge 1000r; Saturae, 617/661-8166; $1499 ❖ MiniPak 1000; Optima Technology, 714/476-0515; $1995.

2.7GB drives: ❖ Nova XL 2700; Microtech International, 203/468-6223; $6289. ❖ Vista 3.5GB; Relax Technology, 510/471-6112; $3499.

SCSI-2 adapter: QuickSCSI; PLI, 510/657-2211; $499.

MIDRANGE HARD DRIVES, Mar 93

Low-capacity drive: La Cie Cirrus 240; La Cie, 503/520-9000; $769.

Notable technology: DiamondDrive 510; Mass Microsystems, 408/522-1200; $2089.

Bargain: APS Fujitsu 520; APS Technologies, 816/478-8300; $1149.

All-around quality: hammer 525FMF; FWB, 415/474-8055; $2799.

MACINTOSH UPGRADES, Jun 93

Classic accelerator (40MHz): TransWarp Classic; Applied Engineering, 214/241-6060; $798 (with FPU).

SE accelerator (50MHz): Gemini Integra; Total Systems, 503/345-7395; $1089 (with FPU).

SE accelerator (25MHz): Quik30; Novy Systems, 904/427-2358; $449 (without FPU).

SE/30 accelerator (50MHz or 33MHz): Universal PowerCache; DayStar Digital, 404/967-2077; 50MHz $999 (with FPU), 33MHz $449 (without FPU).

LC and LC II upgrades: Macintosh LC III Logic Board Upgrade; Apple Computer, 408/996-1010; $599.

Mac II accelerators: ❖ Radius Rocket 25i, Radius Rocket 33; Radius, 408/434-1010; 25i $1199, 33 $2499. ❖ DayStar Digital Universal PowerCache series; DayStar Digital, 404/967-2077; $449 to $999.

IIfx SCSI accelerator: QuickSCSI; PLI, 510/657-2211; $502.

Quadra static-RAM cache card: FastCache Quadra; DayStar Digital, 404/967-2077; $299 for Quadra 700 and 900, $449 for Quadra 800 and 950.

continues

MACWORLD Editors' Choice

OPTICAL DRIVES, Nov 92

3½-inch (128MB): ❖ Magic 128 REM/MO; MacProducts USA, 512/476-5295; $1199. ❖ NuDesign; MacDirect, 612/832-5706; $1298.

5¼-inch (650MB): PMO-650; Pinnacle, 714/727-3300; $4198.

REMOVABLE DRIVES, Nov 92

SyQuest drives: SyQuest drives are the best choice among removable drives for most users, but individual products are too similar for us to single out a specific vendor.

TAPE DRIVES, Dec 92

Personal Backup (up to 150 MB): APS Teac 155; APS Technologies, 816/478-8300; $499.

Midrange backup (150MB to 600MB): ❖ hammerTape 525; FWB, 415/474-8055; $1469. ❖ Vista 600 Tape; Relax Technology, 510/471-6112; $779.

High-capacity backup (1GB and beyond): APS Compression DAT; APS Technologies, 816/478-8300; $1699.

VIDEO/DISPLAY

24-BIT COLOR GRAPHICS BOARD, Feb 93

❖ Spectrum/24 PDQ Plus; SuperMac Technology, 408/541-6100; $1999. ❖ Thunder/24; SuperMac Technology, 408/245-2202; $2999.

COLOR LCD PROJECTION, Jan 93

Display panel: MediaPro; nView Corp., 804/873-1354; $7995.

Low-end panel: TFT Rainbow HD Model 700; Chisolm, 408/559-1111; $5295.

Complete LCD projector: System 6000; In Focus Systems, 503/692-4968; $8495.

VIDEO-CAPTURE BOARD, Jan 93

VideoSpigot; SuperMac Technology, 408/541-6100; $449 to $1399, depending on bundling options.

Software

ACCOUNTING/FINANCE

NETWORK/MULTIUSER ACCOUNTING, Nov 92

❖ Flexware II; Flexware, 916/581-6999; $695 to $895 per module. ❖ Great Plains Accounting; Great Plains Software, 701/281-0550; $795 per module.

PERSONAL FINANCE, Jun 93

❖ CheckWriter 4.0; Aatrix Software, 701/746-6801; $79. ❖ Andrew Tobias' Managing Your Money 5.0; MECA Software, 203/256-5000; $79.95.

SINGLE-USER ACCOUNTING (WITH PAYROLL), Nov 92

❖ Accountant Inc.; Softsync, 305/567-9990; $595. ❖ Checkmark MultiLedger and Payroll; CheckMark Software, 303/484-3541; $395.

SINGLE-USER ACCOUNTING (WITHOUT PAYROLL), Nov 92

M.Y.O.B.; Teleware, 201/586-2200; $249.

BUSINESS TOOLS

STATISTICS, Oct 93

Exploratory data analysis: DataDesk 4.1; Data Description, 607/257-1000; $595.

Comprehensive package: SYSTAT 5.2.1; SYSTAT, 708/864-5670; $895.

COMMUNICATIONS/NETWORKS

HIGH-SPEED FAX MODEM SOFTWARE, Oct 93

Faxstf; Telefocus, 816/886-9800; $79.

NETWARE CONNECTIVITY, Sep 93

NetWare for Macintosh; Novell, 801/429-7000; $495 for 5-user license to $2295 for 200-user license.

NETWORK MANAGEMENT, Feb 93

Network SuperVisor; CSG Technologies, 412/471-7170; $495.

NETWORK DIAGNOSTICS, Feb 93

Ethernet: EtherPeek; AG Group, 510/937-7900; $795.

LocalTalk: LocalPeek; AG Group, 510/937-7900; $495.

SOFTWARE ROUTER, Jul 93

Apple Internet Router 3.0; Apple Computer, 408/996-1010; Basic Connectivity Package $499.

TERMINAL EMULATOR, Oct 93

VersaTerm; Synergy Software, 215/779-0522; $149.

GRAPHICS

2-D CAD, Jan 93

Low-end: BluePrint; Graphsoft, 410/461-9488; $295.

Midrange: PowerDraw; Engineered Software, 919/299-4843; $795.

3-D DESIGN, Aug 93

Price for performance: ❖ Ray Dream Designer 2.0.4; Ray Dream, 415/960-0765; $299. ❖ Alias Sketch 1.5; Alias Research, 416/362-9181; $995.

All-in-one solution: ❖ Infini-D 2.5; Specular International, 413/549-7600; $995. ❖ StrataVision 3D 2.6.1; Strata, 801/628-5218; $995.

DRAWING PROGRAMS (LOW-COST), Sep 93

Budget draw: Expert Draw; Expert Software, 305/567-9990; $49.95.

Budget draw/paint: UltraPaint; Deneba Software, 305/596-5644; $79.

Beginners' program: Aldus SuperPaint; Aldus Corp., 619/695-6956; $149.95.

Vendors: Please write to Macworld Editors' Choice, 501 Second St., San Francisco, CA 94107, or send a fax to 415/442-0766 to inform us of changes in your phone number or your product's list price.

Overall: Canvas; Deneba Software, 305/596-5644; $399.

IMAGE DATABASES, Oct 93

❖ Aldus Fetch 1.0; Aldus Corp., 206/628-5739; $295. ❖ Multi-Ad Search 2.0; Multi-Ad Services, 309/692-1530; $249.

PAINT AND IMAGE-EDITING, Sep 93

Budget buy: Expert Color Paint; Expert Software, 305/567-9990; $49.95.

Overall program: Fractal Design Painter; Fractal Design Corp., 408/688-8800; $399.

Image-editing program: Adobe Photoshop 2.5.1; Adobe Systems, 415/961-4400; $895.

ORGANIZATION/PRODUCTIVITY

CALENDARS, Jul 93

Alarm system: ❖ First Things First; Visionary Software, 503/246-6200; $79.95. ❖ Smart Alarms Plus; JAM Software, 203/630-0055; $125.

All-around scheduler: Now Up-to-Date; Now Software, 503/274-2800; $99.

Meeting scheduler: Meeting Maker; On Technology, 617/876-0900; five-pack $495.

PERSONAL INFORMATION MANAGEMENT, Feb 93

TouchBase/DateBook; After Hours Software, 818/780-2220; $169.95.

SALES-AUTOMATION SOFTWARE, Oct 93

❖ Contact Ease; WestWare, 619/660-0356; one user $395, five users $1495. ❖ CBS; Colleague Business Software, 512/345-9964; $495.

PRESENTATION TOOLS

MULTIMEDIA AUTHORING, Mar 93

Entry-level: ❖ Action; Macromedia, 415/252-2000; $495. ❖ Passport Producer; Passport Designs, 415/726-0280; $495.

UTILITIES

PRINTING, Sep 93

PC-printer cable packages: PowerPrint; GDT Softworks, 604/291-9121; $149.

SECURITY, Feb 93

File encryption and erasure: Citadel with Shredder; Datawatch Corp., 919/490-1277; $149.95.

Full-featured security: ultraSecure; usrEZ Software, 714/756-5140; $239.

Low-cost security: PassProof; Kensington Microware, 415/572-2700; $64.95.

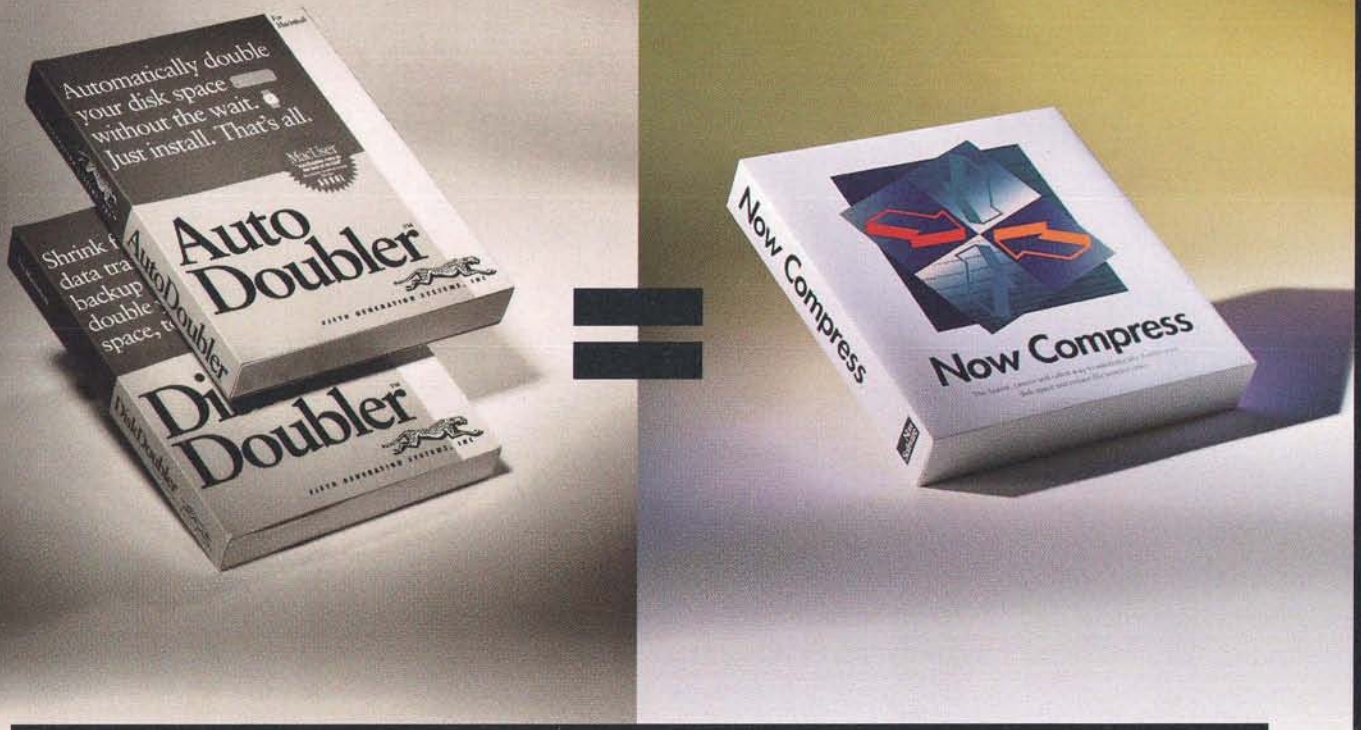
WRITING TOOLS

WORD PROCESSORS, Sep 92

Beginning: WriteNow 3.0; WordStar International, 415/382-8000; $249.

Advanced: Microsoft Word 5.0; Microsoft Corp., 206/882-8080; $495.

Beyond: WordPerfect for the Macintosh 2.1; WordPerfect Corp., 801/225-5000; $495. m



LOOK! IT'S COMPRESSING EVEN BEFORE IT'S OUT OF THE BOX.

Ever wonder why you had to buy one compression program to automatically free up disk space and another to let you shrink files on demand? Ever suspect it was because somebody wanted to bill you twice?

How cynical of you.

Fortunately, Now Compress combines both functions in one rather amazing package. It can double the size of your hard drive by compressing your data smaller than AutoDoubler™, DiskDoubler™ or any other product. Additionally, it creates tiny archives that drastically reduce the time it takes to transfer files throughout a network.

What's more, it decompresses so quickly you won't notice when you're working with compressed data.

In the Now Software tradition, we've humanized the interface to make it far simpler to use than other compression products.

Note the Inspector window on the left. It lets you see the status of any file, folder or disk, and perform any compression operation with a click of your mouse. Now Compress. It's the fastest, safest, most useful compression package you can get.

For the full, non-compressed, story call us at 1-800-237-3611. Or talk to a dealer.

Now Software

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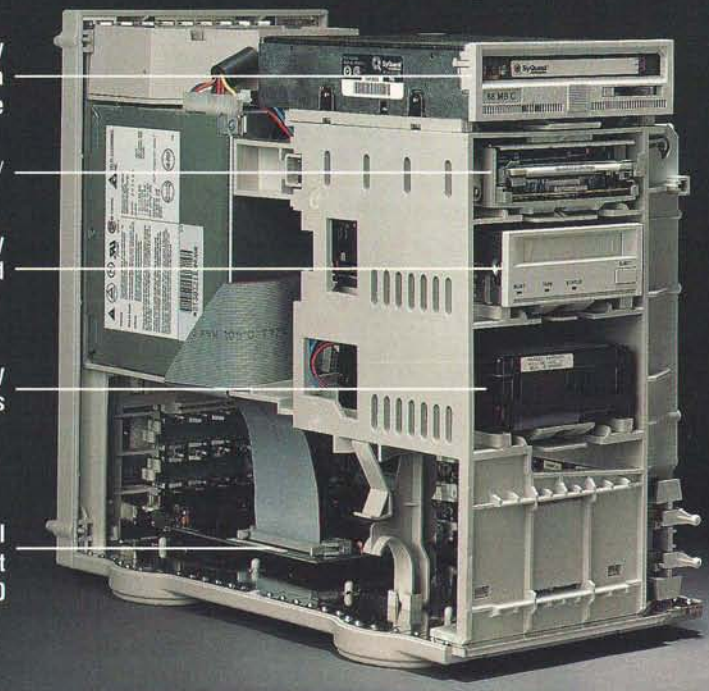
Disk Array Power!

NOW AVAILABLE
Easy to Install Raven Upgrade Kits For Existing Apple 500 or 1000 MB Disk Drives



MicroNet's Raven·800. Disk Array Power For The Quadra 800/840av.

MicroNet is the first to bring disk array power to the Quadra 800/840av. Using a pair of fast spindle disk drives, the Raven·800 transfers up to 6.2 MB/sec of sustained data with average access as fast as 4 ms.

Disk arrays can improve performance up to 400 percent over standard drives. Combine MicroNet's Raven·800 disk array with the speed of the Quadra 800/840av and you have an unbeatable system for audio recording, full rate digital video, and graphics applications such as PhotoShop.

Cost effective two drive disk arrays are available in capacities of 1030 to 5560 MBytes and are expandable to more than 38 GBytes. MicroNet offers Raven upgrade kits for existing MicroNet or factory installed Apple 500 or 1000 MByte drives.

Performance Quality AWARD OF EXCELLENCE Support Commitment

Built on award winning technology, the Raven·800 takes full advantage of Apple's existing hardware. One drive connects to the native SCSI port of the Quadra, and one connects to a MicroNet NuPORT-III, SCSI-2 host adapter. Together, these two drives create a fast, parallel, 16-Bit data path.

MicroNet offers a family of internal data storage systems for the Quadra 800/840av. Included are SyQuest removable systems, rewritable optical drives, and DAT backup systems. We back you with our 24-hour tech support and Over-Night-Exchange service.

To put high performance disk array power in your Quadra 800/840av, call our Sales Department today for the name of your nearest Reseller. 1-714-453-6100. Ask for a free copy of our Quadra 800 Configuration Guide.

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Star Ratings

OVER 400 HARDWARE AND SOFTWARE REVIEWS AT A GLANCE

Edited by Wendy Sharp

Macworld Star Ratings lets you compare hardware and software products for the Macintosh by providing summaries of hundreds of *Macworld*'s authoritative product reviews. The number of stars at the beginning of each capsule review indicates quality; our reviewers assign five stars to outstanding products and one star to poor ones.

If a product has been upgraded since our last review, the most recent version number supplied by the vendor appears in parentheses after the reviewed version number. To read a full review of any product in the listing, please consult the issue listed at the end of each synopsis.

Vendors: Please write to *Macworld Star Ratings*, 501 Second St., San Francisco, CA 94107, to inform us of changes in the version number or list price of your product, or of changes to your phone number.

★★★★★ Best ... ★ Worst

Software

BUSINESS TOOLS

★★★ **4D Server 1.0.1, ACI US, 408/252-4444, $1495 to $3495.** Database server uses the ingenious multitasking technology built into 4D to make it appear that each client has the full resources of the server. If you use 4D on a network, you need this product. **Jun 93**

★★★★ **4th Dimension 3.0.1, ACI US, 408/252-4444, $895.** Multitasking, which greatly improves speed in a carefully designed application, makes this upgraded relational database delightful for both developers and end users. For a relational database, it's impressively easy to use. **Apr 93**

★★ **AccuZip6 1.5.2, Software Publishers, 714/846-1908, $899.** Professional-level mail-list management tool on CD-ROM is the most comprehensive system available, but its messy documentation and inexcusable user-interface violations make our reviewer reluctant to recommend it. **May 93**

★★★★ **Atlas Pro 1.0.6 (2.0), Strategic Mapping, 408/985-7400, $795.** Although this mapping software is not a complete geographic-information system, it boasts a rich feature set and a competitive price. **Nov 92**

★★★ **@Risk 1.1, Palisade Corp., 607/277-8000, $395.** Statistical simulator for Microsoft Excel financial computations generates complex, statistically valid templates within Excel and is the first choice for analysts who work with probabilistic models every day. It assumes that the user is an Excel power user. **Aug 93**

★★★ **Bar Code Pro 1.0 (1.3), Synex, 718/499-6293, $450.** Easy-to-use desk accessory creates bar codes in EPS or PICT for use in desktop publishing or labeling programs. It does well what it sets out to do, but lacks automatic sequential coding and fails to catch invalid characters. **Sep 92**

★★★★ **ClarisWorks 2.0, Claris Corp., 408/727-8227, $299.** Integrated program sets the standard. It provides more features, is easier to use and faster, and has better integration among modules than other available programs. **Aug 93**

★★ **EasyFlow 1.1, HavenTree Software, 613/544-6035, $229.** The rough edges and distinctly un-Mac-like attributes of this flowcharting software reflect its DOS heritage, although on the whole it's easy to use. **Sep 93**

★★★★ **Fair Witness 1.1 (1.2.1), Chena Software, 215/770-1210, $295.** A valuable tool for planning any project, this software coherently integrates outlining, information charts, scheduling, and time charts. **Oct 92**

★★★★ **FileMaker Pro 2.0, Claris Corp., 408/727-8227, $399.** Easier scripting, improved mailing labels and text-handling, and support for QuickTime and Apple events are the major new features of this upgraded, multiuser, flat-file database. Although it has some minor bugs, this is a strong upgrade to an excellent program. **Jan 93**

★★★ **FlowChart Express 1.0 (1.01), Kaetron Software Corp., 713/890-3434, $149.** Inexpensive, easy-to-use flowchart software readily meets the needs of most flowchart creators, although those with extensive requirements will need a larger, more powerful feature set. **Jan 93**

★★★★ **GeoQuery 3.02, GeoQuery Corp., 708/357-0535, $395.** Gain geographic perspective with this custom-map generator and data-analysis software that uses zip codes to create "pushpin" maps of files from your spreadsheet or database. **Nov 92**

★★★ **Helix Express 1.0, Helix Technologies, 708/205-1669, $439.** One of the most distinctive database products ever developed, this relational database has an iconic programming language that sometimes baffles traditional database programmers, but provides an easy route into basic data-handling chores for nonprogrammers. Helix Express is still the ultimate in multiuser simplicity for relational databases. **Jul 93**

★★★ **ithink 2.2.1, High Performance Systems, 603/643-9636, $695.** Although it requires a real training commitment for effective use, this product is an attractive dynamic business modeling system. It's a good bet for identifying cloudy spots in the crystal ball. **May 93**

★★ **Lotus Notes 3.0, Lotus Development Corp., 617/577-8500, $495 per client.** Well-organized, robust, and flexible business data system demands a full-time administrator, preferably with considerable programming experience, for effective use. **Sep 93**

★★★ **MacBarcoda 2.24, ComputaLabel, 508/462-0993, $349 to $895.** Compact, simple-to-use desk accessory creates bar codes in either EPS or Adobe Illustrator 1.1 format. DA cannot automatically create serial codes. **Jun 93**

★★★ **MacProject Pro, Claris Corp., 408/727-8227, $599.** If you're working on a midsize project and like using PERT charts (where tasks appear in boxes and are connected by straight lines), this may be the project-management software for you. However, the multistep scheduling process and the limited integration between charts are frustrating if you prefer Gantt charts. **May 93**

★★★★ **MarcoPolo 2.0, Mainstay, 805/484-9400, $395.** Inexpensive, easy-to-use product allows you or your workgroup to archive and retrieve documents, whether in electronic or paper form. Queries are easy to construct and searches are handled quickly. **Sep 93**

★★ **Memorizer 2.0, Brains Software Engineering, 43-1-865-35-44 (Austria), $100.** Software records dictation from a Mac microphone and you transcribe the dictation in a word processor. You may prefer to stick with a hand-held tape recorder, considering the product's RAM and storage appetite, and its propensity to crash. **Aug 93**

★★★★ **Microsoft Excel 4.0, Microsoft Corp., 206/882-8080, $495.** Create impressive spreadsheets with this upgrade that includes all the features you wished for and more. It's slower, and needs 2MB of RAM for practical use, but almost all users will want to upgrade. **Oct 92**

★★★★ **Microsoft Project 3.0, Microsoft, 206/882-8080, $695.** An amazing range of functions, including new scheduling and formatting, are packed into this project-management software. The improved tool bar helps novices schedule tasks with push-button ease. **Jan 93**

★★★ **Microsoft Works 3.0, Microsoft, 206/882-8088, $249.** Capable but unspectacular upgrade delivers marginally improved functionality and a welcome face-lift to this integrated program, but there are a number of incompatibilities, odd design choices, and performance flaws. **Feb 93**

★★★★ **nuBase Pro 1.5 (1.7), Tactic Software Corp., 407/832-1400, $395.** Although still slower than FoxBase and without the rich feature-set of 4th Dimension, this is the only relational database that makes it possible for users with no programming experience to design a useful database. **Sep 92**

★★ **Office Wiz 1.1 (1.1.4), Oryx Associates, 415/563-9971, $595.** 4D-based program attempts to integrate calendar, project, and contact management, as well as simple accounting for a multiuser environment, but the complexity of the interface requires a substantial in-

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vestment in start-up time. Nov 92

★★★ **Omnis 7 1.1, Blyth Software, 415/312-7100, $1250.** The plain, businesslike functionality of this database-development system produces solid applications without much fuss. Dec 92

★★★ **OrgChart Express 1.0, Kaetron Software, 713/890-3434, $279.** Organization-chart software links a database to standard box-drawing functions. Although the learning curve is steep, the effort may be worth it for people who regularly work with large or complex organization charts. Apr 93

★★★★ **Panorama 2.0 (2.1), ProVue Development Corp., 714/892-8199, $395.** Disarmingly easy-to-learn flat-file database is full of labor-saving data entry features, plus it boasts a remarkable macro function that lets you record and play back almost any series of database routines. May 92

★★★ **Perspective 1.5, U.S. Data on Demand, 800/352-7352, $129.95.** The level of detail and comprehensive information in this collection of U.S. demographic and economic data is impressive, and the reasonable price puts it within reach of even the smallest business. Sep 92

★★★★ **Project Scheduler 5, Scitor Corp., 415/570-7700, $695.** For most midrange project-planning, this program's many hits outweigh its few misses. It goes beyond the requisite scheduling options, with inflation factors and unlimited projects in memory, and it conforms to accepted standards, so you get consistent, predictable results. Aug 93

★★★ **SpreadBase 1.0.1, Objective Software, 415/306-7410, $695.** Powerful business data-analysis tool is a unique combination of database and spreadsheet functions. It's worth a close look for power users, despite meager documentation and a cranky macro language. May 93

★★★ **Wingz 1.1ae, Informix Software, 913/599-7100, $399.** If you want a low-overhead spreadsheet with advanced-math functionality, this is an attractive product. What you get is a competent calculating engine with superior charts; what you miss is outlining, real 3-D spreadsheet linking, and the host of third-party add-ons offered for Microsoft Excel. Jul 93

★★★ **WordPerfect Works 1.2, WordPerfect Corp., 801/225-5000, $249.** A very good word processor, a spreadsheet, a database, charting, drawing, painting, and communications make up the seven well-integrated and flexible modules of this program. It has a few shortcomings, including some memory-management problems, but buyers should generally be pleased. Jun 93

COMMUNICATIONS/NETWORKS

★★★ **A/UX 3.0, Apple Computer, 408/996-1010, $795.** Hybrid–operating-system package implements the Stone Age, type-one-line-at-a-time text interface of Unix in a way a Macintosh user might actually like. Nov 92

★★★★ **AccessPC 2.0, Insignia Solutions, 415/694-7600, $99.95.** Slick control over formatting multiple types of DOS media is the major advantage of this file-transfer utility. Oct 92

★★★ **CompuServe Information Manager 2.0.1, CompuServe, 614/457-8600, $49.95.** The goal of this product is to give friendlier information-access to CompuServe for Macintosh users. An appealing color interface and increased speed are signs of success, but there's still room for improvement. Dec 92

★★★ **Macintosh PC Exchange 1.01, Apple Computer, 408/996-1010, $79.** For basic file-transfer, this control panel device allowing cross-platform file sharing is fine, but it's hardly state-of-the-art. Oct 92

★★★★ **MicroPhone Pro, Software Ventures Corp., 510/644-3232, $295.** Truly comprehensive telecommunications package now includes send-and-receive fax software. Although the new TCP/IP tools are complicated, the documentation is clear and precise. Apr 93

★★ **NetVirtual 2.0, Eclectec, 408/462-2040, $995 to $4985.** One-of-a-kind network-simulation product favors flexibility at the expense of usability. Only after hours of work will your simulation report anything meaningful about your network, and even then the results are difficult to analyze. Apr 93

★★★ **Network Vital Signs 1.0 (1.1), Dayna Communications, 801/531-0600, $449.** Fault-monitoring application continually watches selected network devices and services, monitoring specific equipment for specific errors. Unfortunately, when monitoring more than ten devices, it noticeably degrades the performance of the monitoring Mac. Mar 93

★★★ **On the Air 1.0.1, Digital Eclipse Software, 510/547-6101, $79.99 to $639.99.** Intercom system transmits System 7 SND resources, SoundEdit, and AIFF sound files across a network. It's well designed and performs decently, but its usefulness seems limited. Aug 93

★★★★ **RouterCheck 2.0, Neon Software, 510/283-9771, $895.** Keep your finger on the pulse of router configurations and internet traffic with this network-administration utility. It's a must for midsize or larger internets, but too pricey for small networks. Oct 92

★★ **SoftPC with Windows, Insignia Solutions, 415/694-7600, $499.** The emulation of a complete and accurate Windows environment on a Mac is an amazing accomplishment, but the product is so slow, even on a Quadra, that it performs in what might best be characterized as a dreamlike languor. Jun 93

★★★★ **TechWorks Net Utilities 1.0, Technology Works, 512/794-8533, $129.** Collection of five applications provides essential network-monitoring tools at a price that would please anyone. Dec 92

★★★★ **Timbuktu 5.0.1, Farallon Computing, 510/814-5000, $199 to $5500.** By letting one computer (a Mac or a Windows-based PC) control, observe, or exchange data with another computer, this terminal-emulation product allows you to use resources almost anywhere on a network. Despite minor blemishes, it's a clear winner. Mar 93

DESKTOP PUBLISHING

★★★★ **Aldus Fetch 1.0, Aldus Corp., 206/622-5500, $295.** The rich feature set and network support of this image-cataloging software make it a clear winner. Although cataloging is slow, users have fine control of the depth and compression of thumbnails. Aug 93

★★★ **Aldus PageMaker 4.2, Aldus Corp., 206/628-2320, $795.** Interruptible screen redraw is one of the dozens of enhancements that make this upgrade well worth its price. Even so, some of the features that users need the most—opening multiple documents, for instance—are still missing. May 92

★★ **Aldus Personal Press 2.0, Aldus Corp., 206/628-2320, $199.** Basic, inexpensive page-layout program adds features and gains strength, but is still missing elements that novice users need, such as automatic kerning. Furthermore, its software-knows-best approach to copyfitting makes manual fine-tuning difficult and is almost certain to confuse and confound beginners. Mar 93

★★★ **Apple Font Pack, Apple Computer, 408/996-1010, $99.** Apple's first collection of TrueType fonts includes only 12 fonts that haven't been available since the late eighties in the PostScript format. Still, it's not a bad deal, considering that Adobe PostScript fonts cost four times as much. Mar 93

★★★ **Cumulus 1.1, Canto Software, 415/431-6871, $295.** Good network support, plus a feature that creates a protocol file for recording user actions, make this image-cataloging program a good choice for workgroups. It doesn't have an image preview feature, or offer 32-bit thumbnails. Aug 93

★★★ **Expanded Book Toolkit 1.0.1, The Voyager Company, 310/451-1383, $295.** Using this hypermedia publishing program, average mortals can create highly functional multimedia books in a fraction of the time it would take to do the job unassisted. Be aware, though, that it's no QuarkXPress. Jun 93

★★★★ **FontMonger 1.5.7 (1.5.9), Ares Software Corp., 415/578-9090, $149.95.** Font-conversion utility provides cross-platform, cross-font conversion and makes it easy to create composite, subscript, superscript, and rotated characters. Sep 93

★★★★ **Fontographer 3.5 (3.5.1), Altsys Corp., 214/680-2060, $495.** Versatile tools that enable you to edit PostScript typefaces or create your own are the highlight of this font-design software. But beware, some processes are technical and cumbersome. Nov 92

★★ **ImageAccess 1.0, Nikon, 516/547-4355, $495.** This expensive image-cataloging program has an unusual interface and cannot be used over a network. A plug-in module provides direct support for Nikon's LS-3510AF film scanner. Aug 93

★★ **Kudo Image Browser 1.0, Imspace Systems Corp., 619/272-2600, $295.** This image-cataloging software cannot control thumbnail depth or compression, and doesn't have a keyword feature or allow multiple users to access the catalog simultaneously. The unique Riffle feature lets you quickly scan images. Aug 93

★★★ **Lazy Dog Foundry Personal Font, Lazy Dog Foundry, 612/291-0306, $199.99 to $499.99.** Type 1 font made from your handwriting has clean, even lines—whether or not your writing does. Apr 93

★★★ **LetraStudio 2.0, Letraset USA, 201/845-6100, $249.** Precise, intuitive control over character spacing and shapes, as well as a straightforward interface, make this program a great choice for manipulating type, but it lacks flashy effects, such as gradient fills. Oct 92

★★★★★ **Multiple Master Myriad 1.0, Adobe Systems, 415/961-4400, $185.** Elegant execution and functional design combine in this two-axis Multiple Master typeface that exceeds all previous ideas of electronic font perfection. Jul 92

★★★ **Personal Font, Signature Software, 503/386-3221, $179.95.** Turn your handwriting into a PostScript Level 3 or a TrueType font. The results are good, although not perfect—TrueType letters were not connected

on screen, but this should be corrected with TrueType 2.0. **Dec 92**

★★★ **Publish It Easy 3.0, Timeworks, 708/559-1300, $199.95.** Desktop-publishing program offers writing, editing, formatting, page-layout, drawing, and painting tools with well-thought-out interface innovations, plus an excellent database manager. Unfortunately, the program is unstable and crash-prone. **Mar 93**

★★★★ **QuarkXPress 3.1 (3.11), Quark, 800/788-7835, $895.** Dozens of updated features and frustration-relievers in this upgrade include new palettes and preferences, better zooming, and improved text-editing and -formatting. The program, while still not perfectly behaved, is stable, well designed, and full-featured. **Jul 92**

★★★ **Renaissance 1.0, Eastman Kodak, 800/433-2839, $695.** A strange mixture of power and oversight, this page-design and -layout software provides several slick features, including handling multiple page sizes simultaneously, but blatantly ignores common Mac conventions, such as some keyboard shortcuts. **Dec 92**

★★★★ **Spectacular 1.2, FontHaus, 203/846-3087, $59.** Keep track of fonts efficiently and effectively with this type-specimen generator. Printing specimen sheets is a cinch. **Jan 93**

★★★★ **SuperATM, Adobe Systems, 415/961-4400, $149.** This upgrade to Adobe Type Manager lets you view Adobe-brand PostScript fonts on screen and output them at high resolutions, even when the corresponding printer fonts are unavailable. Although it has limitations, this is an outstanding advance in font technology and a tremendous value. **May 93**

EDUCATION

★★★★ **Algebra, Brøderbund Software, 415/382-4400, $89.95 to $99.95.** Interactive, imaginative math tutorial is keyed to the standard textbook order of topics, but offers much more. It is particularly strong on word problems and graphing. **May 93**

★★★ **The Castle of Dr. Brain 1.0, Sierra On-Line, 209/683-4468, $49.95.** Use logic and raw brain-power to navigate a series of rooms, mazes, and hallways. Puzzles range from simple and mundane to creatively laborious. **Dec 92**

★★ **Comprehensive Review in Biology, Queue, 203/335-0908, $295.** There isn't a textbook publisher in North America with the nerve to publish a black-and-white biology book with nothing more than text and basic line drawings, much less charge several hundred dollars for it, but that, in effect, is what this CD-ROM is. **May 93**

★★★ **Compton's Multimedia Encyclopedia 1.00M, Compton's New Media, 619/929-2626, $795.** The down-to-earth writing style and numerous bells and whistles of this multimedia encyclopedia on CD-ROM appeal to younger readers, but the high cost and sluggish performance may be prohibitive. **Apr 93**

★★★★ **Decimal & Fraction Maze 1.2, Great Wave Software, 408/438-1990, $69.95 to $89.95.** Education software weaves the threads of eight math curricula—from third grade to eighth, along with two levels of adult education—into an interesting and visually stimulating game. **Jul 93**

★★ **Dvorak on Typing 1.0, MacPlay, 714/553-3530, $49.95.** Typing tutor offers solid lessons, but the small annoyances, such as never being able to take intermediate or advanced lessons without first passing a test, add up. **Jun 93**

★★★ **Eco-Adventures in the Ocean, Eco-Adventures in the Rainforest 1.0, Chariot Software Group, 619/298-0202, $59.95.** Explore the ocean or rainforest while avoiding pitfalls and predators in these educational adventure games. Imaginary landscapes that combine features found in different environments may confuse some students. **Nov 92**

★★★ **Headline Harry and the Great Paper Race 1.0, Davidson & Associates, 310/793-0600, $59.95.** Travel through time and across the country as a journalist in this history/geography game. While not an educational masterpiece, it is lots of fun. **Dec 92**

★★★ **MacGlobe 1.3.0, Brøderbund Software, 415/382-4400, $44.95.** Besides maps and bits of fun, such as national anthems, this geography software offers an impressive quantity of demographic and economic information. While it could stand some improvement in data export, it provides a fascinating intellectual adventure. **Feb 93**

★★★★ **Mavis Beacon Teaches Typing 2.0, The Software Toolworks, 415/883-3000, $49.95.** If being entertained while learning to type interests you, this typing tutor provides varied environments, interesting lessons, and good games. **Jun 93**

★★★ **Millie's Math House, Edmark Corp., 206/556-8400, $49.95.** Early math-education software provides a variety of ways for preschoolers to experiment with numbers and counting. It's entertaining and engaging, but more advanced levels and more flexibility would keep children challenged longer. **Jul 93**

★★★★ **The New Grolier Multimedia Encyclopedia, Grolier Electronic Publishing, 203/797-3530, $395.** The remarkably current and scholarly text of this encyclopedia on CD-ROM is suitable for sophisticated readers, while its speed, ease of use, and value are impressive. **Apr 93**

★★ **NihongoWare, Vol. 1, Qualitas Trading Company, 510/848-8080, $349.** Although this Japanese language CD-ROM offers solid instruction, it's so expensive and so limited in its word selection that it's not an economical choice for individual users. **Jan 93**

★★ **The Secret Codes of C.Y.P.H.E.R. 1.0 (1.1), Tanager Software Productions, 510/430-0900, $59.95.** Intriguing facts about mammals and a variety of alphabets provide the interest in this educational game, but the inescapable, repetitive animations are a major detraction. **Apr 93**

★★★ **The Secret Island of Dr. Quandary 1.0 (1.01), MECC, 612/569-1500, $49.95 to $69.95.** Clever package of gorgeous landscapes, catchy sounds, and tempting arcade-game puzzles uses math, logic, and reading skills. Although somewhat slow, it's fun for parents and kids. **Jun 93**

★★★ **Stickybear's Reading Room 2.2a, Optimum Resource, 803/785-7441, $59.95.** Educational game with four different activities takes a sedate but direct path to building primary-level reading skills. It's appropriate for ages four to eight, but probably too juvenile for older kids. **Jun 93**

★★★★ **Transparent Language 1.04M, Transparent Language, 603/465-2230, $139.** Without an iota of glitz or glamour (no sound, graphics, color, or buttons), this foreign-language reader is a superb tool for bolstering language skills through reading. **Oct 92**

★★★★ **Where in America's Past Is Carmen Sandiego? 1.0 (1.3), Brøderbund Software, 415/382-4400, $44.95.** Travel in time and the U.S. chasing those V.I.L.E. crooks in this clever educational history/geography game that's challenging for all ages. **Mar 93**

★★★★ **Where in the World Is Carmen Sandiego? Deluxe Edition, Brøderbund Software, 415/382-4400, $59.95.** The V.I.L.E. gang is at it again, stealing famous objects and fleeing to locations around the world. In this deluxe version of the well-known geography game, there are more crooks, more clues, and more countries to visit. **Oct 92**

ENTERTAINMENT

★★★★ **A-Train, Maxis, 510/254-9700, $69.95.** Charming railroad simulation offers astonishing, and often witty detail, but the learning curve is high and the interface isn't completely Mac-like. **Apr 93**

★★ **America Alive, MediaAlive/CD Technology, 408/752-8500, $99.** QuickTime movies, photographs, maps, text, and audio mingle in this multimedia CD-ROM guide to the U.S. It's a promising concept, but it doesn't yield much useful information. **Mar 93**

★★★★★ **Arthur's Teacher Trouble, Brøderbund Software, 415/382-4400, $59.95.** Every page of this delightful animated book is dense with surprises that arouse and satisfy a child's curiosity. In the words of six-year-old Alex, "It's like chocolate ice cream. You can have it more than once and it's still good." **Apr 93**

★★★ **Battle Enhanced Chess CD ROM, Interplay Productions, 714/553-6678, $79.95.** Elaborately detailed cartoon characters act out little dramas of strategy and capture, complete with sound effects, in this chess game that will drive nine-year-olds mad with glee but may annoy experienced chess players. **Mar 93**

★★★ **The Battle of Britain, Deadly Games, 215/295-2284, $39.95.** It's August 10, 1940. The badly outnumbered British must defend their country against the invading Luftwaffe, and you're in charge. Although the graphics and sound are not spectacular, this is an entertaining, thinking person's game. **Dec 92**

★★★ **Cogito 1.0, Inline Design, 203/435-4995, $59.95.** Rubik's Cube fans will like this challenging game where the goal is to replicate a pattern by moving rows and columns of tiles. It gets more and more complex as you progress through the 120 levels. **Apr 93**

★★★★ **Go Master 5, Toyogo, 802/464-5526, $69.** Go has been called the most interesting board game ever invented. This excellent software version incorporates helpful learning aids and sample games. **Dec 92**

★★★★ **Hellcats Over the Pacific 1.0.3, Graphic Simulations, 214/699-7400, $69.95.** Fly a WWII-era Navy fighter, the Grumman F6F Hellcat, against enemy planes in the South Pacific with this flight simulator that offers smooth graphics, good special effects, and great documentation. **Apr 93**

★★★★ **Insanity 1.0, UV Wave, 318/868-9944, $39.95.** Shoot your Mac with this cool control panel device that offers a choice of nine weapons, ranging from an Uzi to a pigeon. It has first-rate sound effects and detailed animation, but the novelty wears off. **Feb 93**

★★★★ **Jewelbox 1.5, Varcon Systems, 619/**

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563-6700, $49.95. This gem of a game is strongly reminiscent of Tetris. The jewels fall into rows that disappear when you place three jewels of a kind together. **Jun 93**

★★★ **The Journeyman Project, Presto Studios, 619/689-4895, $99.95.** Interactive science-fiction epic on CD-ROM is a work of art. The scenes are rich with painstakingly detailed graphics, elaborate models, and subtle textures, but the sluggish pace may leave you impatient and bored. **Sep 93**

★★★ **Kid Pix Companion, Brøderbund Software, 415/382-4400, $29.95.** Addition to Kid Pix adds clever new features, including the world's easiest-to-use QuickTime movie and presentation modules, but it's less appealing than the delightfully simple original. **Oct 92**

★★★★ **Maelstrom 1.03, Ambrosia, P.O. Box 23140, Rochester, NY 14692-3140, $15 plus $5 shipping and handling.** Fast-paced arcade game is loosely modeled after Asteroids, the Atari classic. Maelstrom features superb animation, hilarious sound effects, exciting action—and best of all, it's shareware. **Jun 93**

★★★★ **Monkey Island 2: LeChuck's Revenge, LucasArts Games, 415/721-3394, $59.95.** This whimsical Twilight Zone of life on the high seas is the adventure-game equivalent of *Mad* magazine, filled with witheringly sarcastic dialogue, splendid gross-out jokes, heapings of self-parody, and enough hilarious detail to keep you amused for days. **May 93**

★★★ **Mozart: The "Dissonant" Quartet, The Voyager Company, 310/451-1383, $59.95.** This CD-ROM includes an unusual essay on the anatomy of stringed instruments, brief discussions of general musical concepts, an analytical overview of the quartet, and a taped minilecture on Mozart's life, but sadly enough the music is limited almost entirely to the title piece. **Apr 93**

★★ **The Orchestra: The Instruments Revealed, Time Warner Interactive Group, 818/955-9999, $79.98.** The many-branched, interwoven, hypertext style of this music-education CD-ROM makes it hard to navigate and digest, despite its richness. For the price, other music-education CD-ROMs present better values. **Apr 93**

★★★★ **Poetry in Motion, The Voyager Company, 310/451-1383, $29.95.** Performance videos of contemporary poets are juxtaposed with the texts of their poems and taped interviews in this intriguing CD-ROM that combines the excitement of the stage with the reflective appeal of the page. **Feb 93**

★★★ **Red Baron 1.0, Dynamix, 800/326-6654, $69.95.** The romance of history and the realism of a flight simulator combine in this World War I flight game. Despite small annoyances, including too many dialog boxes to get to the simulation, this game will charm any aspiring ace. **Nov 92**

★★★★ **Richard Strauss: Three Tone Poems, The Voyager Company, 310/451-1383, $59.95.** *Don Juan, Till Eulenspiegel,* and *Death and Transfiguration* are the three works included in this CD-ROM, with a program written by Russell Steinberg. The musical analysis is satisfying, and the lush orchestral music will appeal to both novice and experienced classical music listeners. **Apr 93**

★★★ **Rodney's Wonder Window, The Voyager Company, 310/461-1383, $39.95.** Collection of 23 colorful, wacky graphics and animations by Rodney Alan Greenblat is charming but uneven. The overall look is surreal and cartoonish, but while some modules are elaborate and sophisticated, others are simple and not particularly interesting. **Mar 93**

★★★ **Schubert: "The Trout" Quintet, The Voyager Company, 310/451-1383, $59.95.** Alan Rich, classical music commentator for National Public Radio, conveys his enthusiasm for this appealing music in this CD-ROM's lively text. However, the discussion is relatively unchallenging and the musical performance, though well regarded, is not at the top of most reviewers' lists. **Apr 93**

★★★ **Sherlock Holmes, Consulting Detective, Volume II, Icom Simulations, 708/520-4440, $69.95.** Match wits with the legendary detective by solving three difficult mysteries in this CD-ROM game. **May 93**

★★★ **SimLife, Maxis, 510/254-9700, $69.95.** A megalomaniac's dream come true, this amazingly intricate simulation game lets players create and control ecosystems. It's not easy, but the reward is an increased understanding of the complex interrelationships of life. **Feb 93**

★★★★ **So I've Heard, Volume 1: Bach and Before, The Voyager Company, 310/451-1383, $24.95.** Engaging text by classical-music critic and lecturer Alan Rich describes nearly two millennia of western music (up to the mid-eighteenth century) in this CD-ROM. It offers a unique and affordable opportunity to sample 50 or so performances, styles, and compositions. **Feb 93**

★★★ **Space Quest 1: Roger Wilco in the Sarien Encounter, Sierra Online, 209/683-8989, $19.95.** As Roger Wilco, starship janitor, you must defeat the evil Sariens in this adventure game where your head is more important than your hands. Puzzles range from the obvious to the head-scratching, but for most players the game will be easy to complete. **Apr 93**

★★★ **Super Mines 1.0, Callisto Corp., 508/655-0707, $49.95.** You use logic to search a minefield without setting off mines in this fast-paced game that's easy to learn, but offers 84 levels for long playability. **Apr 93**

★★★★ **Super Tetris, Spectrum HoloByte, 510/522-3584, $49.95.** Teensy tiles are a minor negative in this exceptional tile game that's more varied, more challenging, and more forgiving than the original. **Oct 92**

★★★ **Warlords, Strategic Studies Group, 904/494-9373, $49.95.** A medieval fantasy world is the setting for this colorful game of strategy and conquest with beautiful graphics. Unfortunately, the computer opponents are not challenging enough for an experienced war-gamer, although human opponents may be. **Dec 92**

★★★★ **Who Killed Sam Rupert, Creative Multimedia Corp., 503/241-4351, $39.99.** You're a police detective trying to solve the murder of a popular restaurateur in this interactive CD-ROM that exploits the full range of multimedia options and provides a wealth of clues and surprises to hold your interest. **May 93**

FINANCE/ACCOUNTING

★★ **Andrew Tobias' TaxCut for Macintosh, MECA Software, 203/256-5000, $79.95.** The occasionally awkward interface of this personal tax-preparation software doesn't follow every Mac standard, but the help system is very good. State versions are available for California and New York. **May 93**

★★★★ **BestBooks 1.0, Teleware, 201/586-2200, $99.** In a straightforward, unintimidating manner, this small-business accounting program integrates the standard bookkeeping functions of accounts receivable, accounts payable, and general ledger. There's little to criticize, except the weak documentation. **Jul 93**

★★ **Business Sense 1.6, Software Developers Consortium, 801/288-2216, $199.** Competent, single-user, all-in-one bookkeeping package will adequately help you keep the books for a small company, but it's not as easy to use as its competition. **Feb 93**

★★★★ **Components 1.0, Satori Software, 206/443-0765, $795 per module.** Simple, flexible architecture sets a new design standard for Macintosh accounting software, but is not without its bugs and flaws. **Sep 92**

★★★ **MacInTax 1992, ChipSoft, 619/453-8722, $79.95.** It's difficult to correct your errors when using this personal tax-preparation software, but it's definitely easier than doing your taxes by hand. The display is attractive, the program supports electronic filing, and there are 15 state-tax versions available. **May 93**

★★★★ **Managing Your Money 5.0, MECA Software, 203/256-5000, $79.95.** An already strong financial-management program becomes easier to use and slightly more powerful with this upgrade. **Jan 93**

★★★★ **Timeslips III 2.1, Timeslips Corp., 508/768-6100, $299.95.** Complexity is the price you pay for this time-billing utility's impressive flexibility. Fortunately, thorough documentation, excellent tech support, and default settings help any user get started. **Sep 92**

★★★ **WealthBuilder 2.0, Reality Technologies, 800/346-2024, $79.99.** Financial-planning software forces you to think about your money and helps you develop an investment plan. It's a good program for beginning investors, but more-sophisticated investors will want more-advanced features. **May 93**

GRAPHICS

★★★ **addDepth 1.0.2, Ray Dream, 415/960-0768, $179.** The purpose of this graphics program is to enhance the creation of 2-D images with 3-D effects. It's versatile, accommodating, and affordable, but working on complex images gets tedious because of the automatic application of styles. **Aug 93**

★★★ **Adobe Dimensions, Adobe Systems, 415/961-4400, $199.** This three-dimensional-effects utility may seem very limited, with white-only light and no surface texturing, but it's a ground-breaking product. It performs its 3-D illusions within the object-oriented, resolution-independent world of PostScript. **Apr 93**

★★★★ **Adobe Photoshop 2.5, Adobe Systems, 415/961-4400, $895.** No graphics program is as universally loved and as downright deserving of user loyalty as this one, but while this upgrade builds on the program's wide range of capabilities, it ignores some minor weaknesses that have begun to peek through the product's armor. It's still great but perhaps not perfect. **Jun 93**

★★★ **Aldus FreeHand 3.1 (3.11), Aldus Corp., 206/628-2320, $595.** A pressure-sensitive freehand tool is the most remarkable new feature of this updated drawing program. Substitution for missing fonts is another good addition, but skimpy text-editing tools and incomplete support for EPS continue to diminish its value. **Jun 92**

★★★★ **Alias Sketch 1.5, Alias Research, 416/362-9181, $995.** The enhanced modeling and revamped rendering capabilities of this 3-D illustration program contribute to a tremendous and reliable upgrade, a heartening

example of a company listening to its users and delivering on its promises. **Jul 93**

★★ **ArtBeat Professional 1.0, Pie Practical Solutions, 201/902-9500, $249.** Despite a smattering of unique capabilities, this inexpensive draw and paint program lacks many of the features of equivalent programs. **Apr 93**

★★★ **artWorks 1.0, Deneba Software, 305/596-5644, $149.** If you're expecting a graphics dynamo, this combination paint and draw program will leave you a little cold. But despite its flaws, it ranks as one of the best graphics programs available under $200. **Jun 93**

★★ **AutoCAD Release 11 (12), Autodesk, 415/332-2344, $3500.** Customizable, bare-bones drafting upgrade partially implements a graphical user interface. Few add-ons are currently available. **Dec 92**

★★★★ **Blueprint 4.0, Graphsoft, 410/461-9488, $295.** Entry-level 2-D drafting program is a wonderful antidote to the complicated CAD system blues. Don't be misled by the low price; this full-fledged drafting package is powerful enough to serve professionals who appreciate the value of simplicity. **Jul 93**

★★★ **Cachet 1.0 (1.2), Electronics for Imaging, 415/742-3400, $595.** The tools, interface, output, and documentation of this color-image editor are all quite impressive for a first version, but serious failings include slowness and disappointing sharpening. **Dec 92**

★★★ **Color It 2.0.1, Timeworks, 708/559-1300, $299.95.** Overpriced color paint program has a full range of painting and image-retouching capabilities, including 15 levels of undo and an impressive magic-wand tool, but its naming conventions are bewildering. **Apr 93**

★★ **CPM Graphic Tutor 1 & 2, Caseys' Page Mill, 303/220-1463, $489 per volume.** Although some neophytes may find these CD-ROM tutorials on Adobe Illustrator and Adobe Photoshop helpful, the programs' distracting interfaces, inconsistent execution, lack of polish, and high price weigh strongly against them. **May 93**

★★★ **DesignCAD 2D/3D 3.0.1 (4.0), DesignCAD, 918/825-4848, $499.95.** Despite slow rendering, this general-purpose 3-D modeler with 2-D drafting capabilities represents a price and performance breakthrough in 3-D modeling programs. **Nov 92**

★ **Easy Color Paint 3.0, MECC, 612/569-1500, $59.95.** For a program that purports simplicity, this color paint program is anything but. Possibly the weakest, least intuitive paint program for the Mac, it's unnecessarily complex and frustrating. **Jul 93**

★★★★ **ElectricImage Animation System 1.5.1, Electric Image, 818/577-1627, $7495.** The most powerful animation program for the Mac improves its documentation and rendering, and adds an intuitive project window that allows you to control all aspects of animation from a single location. Unfortunately, it still retails for the price of a European vacation for two. **Feb 93**

★★★ **Expert Draw 1.0, Expert Software, 305/567-9990, $49.95.** Inexpensive draw program is not really for experts, but it offers a decent, no-frills set of basic drawing tools and commands for beginning illustrators, office use, or anyone on a budget. **Aug 93**

★★★★ **Folio 1 Media Kit, D'Pix, 614/299-7192, $299.95.** Each image in this texture collection on three CD-ROMs provides a dynamic range of colors, highlights, and shadows; is free of artifacts; and is crisply focused. The collection as a whole is well chosen, although the high-resolution images are hard to access. **Aug 93**

★★★★ **Fractal Design Painter 2.0, Fractal Design Corp., 408/688-8800, $399.** If you can put up with a few inconveniences and surprises, this color paint software provides the real meat-and-potatoes tools required by professional artists, and many of its functions—natural media brush tools, the color-sensitive magic wand, 2-D lighting effects—are entirely without peer. **Jul 93**

★★★ **Generic CADD 2.0, Autodesk, 206/487-2233, $495.** Competent, midlevel 2-D drafting program has a well-executed Mac interface, a good complement of tools, and a sprinkling of high-end features, such as floating-point precision. **Aug 93**

★★ **Image Assistant 1.0, Caere Corp., 408/395-7000, $495.** Besides unsatisfactorily addressing Adobe Photoshop's small list of liabilities, this image-editing software is barely able to keep up with less expensive bitmap editors. Problems include an unforgivable lack of antialiased text, no selective revert function, and an incorrectly implemented smudge tool. **Apr 93**

★★★★ **Infini-D 2.0 (2.5), Specular International, 413/549-7600, $995.** Rich combination of 3-D modeling, rendering, and animation tools at a relatively affordable price. Visualization program works well, offers a nicely integrated approach to rendering, and is generally stable. **Jan 93**

★★★★ **IntelliDraw 1.0, Aldus Corp., 206/628-2320, $299.** Crowd-pleasing features such as physical and dynamic links make this automated draw program a great environment for planning and presenting, although it's less satisfying as a free-form drawing tool. **Nov 92**

★★★★ **Kai's Power Tools Volume 1 1.0, HSC Software, 310/392-8441, $149.** Photoshop plug-ins include image-editing filters; texture, gradient, and fractal generators; and special-effects tools. Although at times monstrously complicated, this collection represents a virtually infinite supply of visual resources. It's an amazing tool that no regular Photoshop user should be without. **May 93**

★★★★ **MiniCAD+ 4, Graphsoft, 410/461-9488, $795.** Professionals should be delighted with this highly competent CAD package's evolution into 3-D. It has maintained its features-champion status and is easier to use. **Mar 93**

★★★ **Ofoto 2.0, Light Source Computer Images, 415/461-8000, $395.** Many new features—notably color support—have been added to the already impressive toolbox of this scanning software. It often produces good results, but it rarely produces the best scan possible for a given image and output method. **Jul 93**

★★★★ **Paint It 1.0, Timeworks, 708/559-1300, $59.95.** Straightforward color paint program lacks image-editing tools but has a versatile cast of selection and painting tools—and it's priced to sell. **Apr 93**

★★★★ **PosterWorks 3.0, S.H. Pierce & Co., 617/338-2222, $395.** This large-format graphics production tool is for people who think big, up to 10,000 square feet big. It fills the need for user-defined, full-color, large-format output robustly and elegantly. **Aug 93**

★★★★ **PowerDraw 4.0, Engineered Software, 919/299-4843, $795.** The best new feature of this polished 2-D drafting program is an open architecture that supports modules that let you customize the program with application-specific tools, floating palettes, and menu commands. **Sep 93**

★★★★ **Ray Dream Designer 2.02 (2.06), Ray Dream, 415/960-0765, $299.** Experienced 3-D aficionados will find this 3-D–imaging software a welcome addition to their arsenal, and beginners may find it ideal for the leap from 2-D to 3-D. Improved text-handling and viewing capabilities would make it even better. **Sep 92**

★★★★ **Sketcher, Fractal Design, 408/688-8800, $149.** A variety of effects reproduce techniques of traditional drawing tools with this wonderful gray-scale paint and image processing program. **Feb 93**

★★★★ **Smoothie 1.02, Peirce Software, 408/244-6554, $149.** Create smoother screen images with this handy utility that antialiases the edges of on-screen artwork. Although it can't accommodate sound or accept imported QuickTime movies, it's a must for anyone who uses a Mac for presentations. **Nov 92**

★★ **StrataType 3d 1.0 (2.0), Strata, 801/628-5218, $199.** The rulers, texture palette, custom bevels, and canned positioning schemes of this 3-D type-effects software are nice, but they can't compare with the animation skills, single-character positioning features, lighting capabilities, and superb rendering of other available programs. **Mar 93**

★★★ **Tree, Onyx Computing, 617/876-3876, $295.** Single-purpose program generates lifelike color drawings of trees from a number of easily controlled parameters. Although visually appealing, it's an expensive way to draw a tree. **May 93**

★★★ **Typestry 1.0 (1.1), Pixar, 510/236-4000, $299.** Type enters the third dimension with this reasonably priced 3-D typographic effects and animation program. There's room for improvement, but it's an exciting tool for designers, multimedia producers, and those who enjoy working with type. **Nov 92**

★★★ **Virtus WalkThrough 1.1.3, Virtus Corp., 919/467-9700, $495.** Interactive 3-D modeling tool provides instantaneous access to rendered 3-D scenes, allowing you to travel through models at will. While it has some problems (such as occasionally just quitting), it's an excellent value that may change both how you design and how you think about design. **Jul 93**

★★★ **Wraptures One, Wraptures Two, Form and Function, 619/536-9999, $95 each.** The images in these texture collections on CD-ROM are generally acceptable, although some are muddy and others are difficult to decipher at low resolutions. If you need images for repeating patterns, however, these repeat seamlessly and are a good value. **Aug 93**

MATH/SCIENCE

★★★ **Alchemy III, Tripos Associates, 314/647-1099, $950.** Molecular-modeling software can model decapeptides and DNA fragments, in addition to the expected small molecules, with refreshing alacrity on a Mac IIci or better. **Sep 93**

★★★ **Amazing Universe 2.1, Hopkins Technology, 612/931-9376, $79.95.** Space-image exploration package on CD-ROM offers an amazing variety of astronomical images with a very competent program (ProVision II) for modifying and inspecting those images. It assumes that users won't be fazed by such things as writing their own image-convolution matrices. **Aug 93**

★★★ **Caduceus Physics 1.0, Scientia, 617/776-3427, $130.** Giant HyperCard stack consists of

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MACWORLD Star Ratings

carefully indexed cards covering small conceptual bites of physics; it's the first in a series of programs designed to prepare students for the Medical College Admissions Test (MCAT). **Jan 93**

★★★★ **CircuitMaker 3.0, MicroCode Engineering, 801/226-4470, $200.** Much of the tedium of diagramming circuits and constructing prototypes is relieved by this digital circuit simulator that provides a powerful set of basic tools for a very reasonable price. **Aug 93**

★★★★ **Data Desk 4.0 (4.1), Data Description, 607/257-1000, $595.** For finding patterns in data, this statistical-analysis program has no peer. Years of refinement have made it a unique, and uniquely valuable, tool for analysis, despite its lack of some tests found in larger programs. **May 93**

★★★ **Expert Astronomer 1.0 (1.1), Expert Software, 305/567-9990, $49.95.** Draw maps of the sky from any location in the Solar System and learn about celestial objects with this astronomy software. Most effective in color, this is a great educational tool for beginners and a reference database for experts. **Dec 92**

★★★★ **Expressionist 3.0 (3.01), Prescience Corp., 415/543-2252, $199.95.** If you work regularly on similar topics, you can customize this equation-writing software to produce equations with exactly the appearance you want, letting you work at amazing speed. **Mar 93**

★★★ **FASTAT 2.0, SYSTAT, 708/864-5670, $495.** Statistical business-analysis software makes sense as a day-to-day statistics tool for business or scientific users. It provides the right statistical tests for most requirements, and its graph types provide plenty of information, although they lack glamour. **Jun 93**

★★★ **f(z) 6, Lascaux Graphics, 602/299-0661, $115.** The main problem this math software attacks is four-dimensional visualization. It costs slightly more than a textbook, making it a great educational bargain. **Sep 93**

★★★★ **HiQ 2.0, Bimillennium Corp., 408/354-7511, $995.** The three great strengths of this numerical mathematics software are its fast and capable differential-equation–solving section, its excellent matrix-math capabilities, and its very natural notebook-format interface. **Sep 93**

★★★★ **Interactive Physics II 1.0 (1.01), Knowledge Revolution, 415/553-8153, $399.** Motion simulation software is an improvement over traditional classroom instruction in physics. This new version greatly expands the range of problems that can be solved, and adds support for QuickTime. **Dec 92**

★★★ **LabTutor 2.0, J. K. Eaton, 415/723-1971, $50.** Tutorial on laboratory computer-interfacing provides a detailed, thorough exposition of computer interfacing in general, but it requires LabView and a National Instruments interface board for its exercises. **Sep 93**

★★★★ **MacBreadboard 1.1 (1.13), Yoeric Software, 919/644-1620, $59.95.** Useful educational engineering software simulates with excruciating detail every aspect of a digital integrated-circuit breadboard trainer. It accurately replicates and even surpasses the behavior of a physical breadboard—without burning out IC chips. **Dec 92**

★★★★ **MacPhase 1.2, Otter Solutions, 315/768-3956, $159.** Low-cost, scientific-data-visualization software with a large assortment of mathematical tools is one of the few authentic bargains in science software. One of its principal strengths is a well-planned color lookup table editor that's delightfully easy to use. **May 93**

★★★★ **Maple V, Brooks/Cole Publishing, 800/354-9706, $493.95.** For functional scope and ease of use on a basic Mac (such as a Classic or Plus), this symbolic math software has no competitors. **May 92**

★★★ **MathCAD 3.1, MathSoft, 617/577-1017, $495.** Numerical and symbolic computation software is easy to learn, easy to use, produces good reports, and is much more powerful than earlier versions. It still doesn't compete in scope with the largest math programs, but for most science and engineering tasks, it's a fast way to get problems solved. **Jun 93**

★★★★ **Mathematica 2.2, Wolfram Research, 217/398-0700, $595.** The one essential program in science and mathematics adds a function browser that makes the program as easy to use as it should be, as well as improvements to computational routines. **Sep 93**

★★★★ **MathType 3.0, Design Science, 310/433-0685, $199.** This equation-writing software makes automatic typographical decisions, which is helpful if you produce documents on a wide range of subjects. Its smooth integration with Microsoft Word is also convenient. **Mar 93**

★★ **NueX 1.1 (1.3), Charles River Analytics, 617/491-3474, $295.** Lightweight introduction to artificial neural networks and knowledge-based expert systems has some merit, but cannot be considered a serious production tool. **Oct 92**

★★★★ **Sequencher 2.0 (2.0.8), Gene Codes Corp., 313/769-7249, $2200.** While not implementing everything a DNA researcher could want, this software for manipulating DNA-sequence information does provide the things a researcher really needs. The single best feature is its raw speed. **Dec 92**

★★★ **Simulink 1.2, The MathWorks, 508/653-1415, $3995.** If you hear the word *Bode-plot* several times a week at work, this math-simulation software is designed to make your life wonderful. Little glitches and a command-line orientation are drawbacks. **Dec 92**

★★★★ **Spyglass Dicer 2.0, Spyglass, 217/355-6000, $695.** Scientific 3-D visualization tool displays a two-dimensional slice through a three-dimensional object (which is represented in the computer by a data table). While Dicer pushes the limits of the Macintosh hardware, for its function this product is really the only game in town. **Jul 93**

★★★ **Spyglass Transform 3.0, Spyglass, 217/355-6000, $595.** Scientific-visualization software can access data stored in every common format, offers some useful presentation-graphics features, and includes a programming language with a large range of built-in, high-level scientific functions. **Sep 93**

★★★ **StatView 4.0m, Abacus Concepts, 510/540-1949, $595.** A nice mix of statistical prowess and operating convenience distinguish this statistical-analysis and presentation software. The printing options are outstanding. **Nov 92**

★★★★ **Theorist 1.5, Prescience Corp., 415/543-2252, $449.95.** Symbolic-mathematics program that you can figure out by yourself adds a useful table feature, more special functions of physics, and better graphics. Plus, it's still the only program to use real notation directly. **May 93**

★★★★★ **Voyager II, Carina Software, 510/352-7328, $159.95.** If a brilliantly-lit, star-filled sky holds more than a moment's fascination for you, you need to know about this astronomy program. In a firmament of mostly faint and forgettable astronomy software, it's a supernova. **Jul 93**

ORGANIZATION/PRODUCTIVITY

★★★ **Achieving Your Career 1.02, Up Software, 415/921-4691, $69.** HyperCard-based job-search software succeeds by compactly organizing. It provides a structure for identifying letters to write, phone calls to make, and interviews to follow up. **Aug 93**

★★ **ACT 1.0 (1.01), Contact Software International, 214/919-9500, $395.** While this contact manager has several laudable features, such as customizable contact views and an integrated word processor, learning how to use it is a frustrating experience. **Feb 93**

★★★★ **Agent DA 2.0 (2.1.3), TeamBuilding Technologies, 514/278-3010, $99.** Simple, flexible calendar/reminder program includes every obvious calendar function—easy navigation, extensive print options, adjustable displays, recurring events, and even a straightforward manual. **Sep 92**

★★★ **Amaze Daily Planners: Cathy, The Far Side, Word-A-Day (2.0/1993), Amaze, 206/820-7007, $69.95.** A cartoon (or word) a day makes scheduling more fun with these icon-based calendar/daily planners, but the graphics take up a lot of hard drive space, and the programs must be running in order for alarms to sound. **Sep 92**

★★ **ClienTrac 1.7.1, Whiskey Hill Software, 415/851-8702, $135.** Easy-to-use, HyperCard-based contact-management software performs as billed, but fails to inspire much enthusiasm. **Aug 93**

★★ **Connections 2.1, Heizer Software, 510/943-7667, $199.** A wider range of scheduling features, new printing options, and improved networking capabilities don't change the fact that this HyperCard-based personal information manager is just too slow. **Nov 92**

★★★ **Contact Ease 2.0.1, WestWare, 619/660-0356, $395 to $1495.** Contact-management and sales-automation software helps salespeople keep in touch with contacts, makes it easy to generate letters, and maintains detailed records of activities. It has a few quirks but is overall a good program. **Aug 93**

★★★★ **DateBook 1.5.1 (1.5.li), After Hours Software, 818/780-2220, $125.** Personal time manager offers a flexible approach to event scheduling and to-do-list management. This upgrade adds new features and fixes bugs that plagued the first version. **Feb 93**

★★★★ **DayMaker 2.0 (2.03), Pastel Development Corp., 212/941-7500, $129.95.** If you need to organize lots of disparate information, follow up on meetings with many people, keep track of your own calendar, create an archive of completed work, and print out lists of to-do items to take on the road, this free-form personal information manager is a great choice. **May 93**

★★★ **Dynodex 3.0, Portfolio Software, 408/252-0420, $89.95.** The speed and printing options of this field-based address-book manager are its strengths, but this upgrade adds welcome improvements to the interface, including automatic formatting of phone numbers. **Apr 93**

★★★ **EasyAlarms 2.0.3 (2.1), Essential Software, 619/481-1477, $99.** Complex, flexible calendar, reminder, and to-do list program includes scripting and sound recording among many other features. **Nov 92**

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Circle 51 on reader service card

MACWORLD Star Ratings

★★ **Hello, Atelier Systems, 619/453-4300, $99.** Unusual combination of contact management and word processing in a compact package. This first release is hampered by several notable flaws, such as text documents that must be linked to a contact name. **Jan 93**

★★★★ **In Control 2.0, Attain Corp., 617/776-1110, $129.95.** The best features of an outlining program are combined with those of a database, making it easy to sort, search, organize, and print your to-do list. **Aug 93**

★★★★ **Inspiration 4.0, Inspiration Software, 503/245-9011, $295.** Watch your ideas evolve in a dynamic diagram mode and a text-based outline mode with this brainstorming tool. It works best as a vehicle for organizing and developing ideas. **Feb 93**

★★★ **Intouch 2.0.4, Advanced Software, 408/733-0745, $99.95.** Free-form database is a fast and easy way to manage contact information. Program offers flexible data entry instead of automatic formatting. Although this version adds a handy reminder system, it falls short as a calendar planner. **Feb 93**

★★★ **LapTrack For the Mac 1.0b, Timeslips Corp., 508/768-6100, $79.95.** Time- and expense-tracking program offers the right features for the on-the-go professional, but the interface is overcomplicated and the documentation is sloppy. Still, in spite of its flaws, it does an excellent job. **May 93**

★★★ **Nolo's Personal RecordKeeper 3.0, Nolo Press, 510/549-1976, $34.96.** Hierarchically configured database organizes your personal affairs, including legal matters, financial records, insurance plans, family history, and more, but it is frustratingly inflexible. **Jan 93**

★★★★ **Now Up-to-Date 2.0, Now Software, 503/274-2800, $99 to $799.** Calendar utility combines flexibility, ease-of-use, and streamlined operations in an almost irresistible package. The Reminder control panel, while a great new feature, has had minor conflicts. **Jun 93**

★★★ **Office Manager 2.1 (2.5), White Crow Software, 800/424-0310, $99.** Simple contact- and project-management software is powerful for small databases, but reliance on HyperCard limits its usefulness for low-end Macs. **Dec 92**

★★★★ **Spiral 1.0 (1.02), Technology Works, 512/794-8533, $129.** Designed specifically for taking and organizing notes, this product provides an excellent feature set, including bookmarks and an option for automatically expanding abbreviations, but it's marred by some errors in the editing and import/export processes. **Mar 93**

★★ **TimeVision 1.0, Powercore, 815/468-3737, $99.** New scheduler with notepad and card-file functions tacked on has some worthwhile features, but in general doesn't match up to the competition. **May 93**

PRESENTATION TOOLS

★★★★ **Action 1.0 (1.02), Macromedia, 415/252-2000, $495.** Entry-level multimedia integration program offers, for its price, a rich selection of features, including an excellent variety of transitions as well as gradient and patterned backgrounds. It makes producing presentations with sound and motion surprisingly easy. **Feb 93**

★★★★ **Adobe Premiere 2.0 (2.0.1), Adobe Systems, 415/961-4400, $695.** A dream command post for video professionals, this QuickTime movie-editing software produces stunning special effects with little effort. Only the program's appetite for memory, disk space, and computer horsepower prevent it from being the nonprofessional's dream as well. **Jan 93**

★★★★ **CameraMan 1.0 (1.1), Vision Software International, 408/748-8411, $149.** If you need to record continuous screen operations, this screen recorder is the best deal around. It handles 32-bit QuickDraw, takes advantage of QuickTime's long list of compression and playback capabilities, and even uses custom frame sizes. **Sep 92**

★★ **Comet CG 1.0.3, MSI, 317/842-5097, $995.** Program for generating antialiased text over live video is reasonably priced compared with dedicated graphics systems, but you're likely to be as astonished by its limitations as you are impressed by its capabilities. It offers too few formatting options, a cumbersome interface, and an insubstantial manual. **May 93**

★★★ **DiVA VideoShop 1.0, DiVA Corp., 617/491-4147, $599.** Instantaneous playback sets this graceful QuickTime editing software apart. Its simple beauty is slightly offset by a few rough edges, a lousy manual, and an occasionally clumsy interface. **Jul 92**

★★★ **Hi Rez Audio Volume 1.0, Presto Studios, 619/689-4895, $149.95.** The enjoyable, high-quality music on this CD-ROM adds a nice touch to presentations. The software for browsing the music is quirky, and the product could use some documentation. **Jul 93**

★★★ **Interactive Training for Director 1.1, Media In Motion, 415/621-0707, $199.** This somewhat expensive program teaches basic Macromedia Director skills and provides a foundation for exploring Director's other features. It has a clear, often lighthearted approach, but navigating the lessons can be frustrating. **Jun 93**

★★★ **Macromedia Director 3.1 (3.1.1), Macromedia, 415/252-2000, $1195.** This minor update to a powerful and versatile multimedia authoring tool adds 23 scripting commands, QuickTime importing and editing, and a utility that compiles movies into a faster playback format—but the whopping $149 addition to the price makes it an upgrade most users can afford to miss. **Feb 93**

★★★ **Media-Pedia Video Clips, Media-Pedia, 617/235-5617, $195 to $495.** Fifty-seven minutes of stock footage for use in QuickTime movies includes over 150 different segments, ranging from unremarkable to dramatic to genuinely funny. **Apr 93**

★★★★ **Microsoft PowerPoint 3.0, Microsoft, 206/882-8080, $495.** This remarkable upgrade puts this presentation program ahead of the pack in terms of convenience and ease of use. Although the ready-made template collection is pretty paltry, the extensive system of master layers, reliable cross-platform compatibility, and strong on-screen presentation capabilities more than compensate. **Feb 93**

★★★ **Morph 1.0 (1.1), Gryphon Software Corp., 619/454-6836, $149.** With patience and practice, you can become a high-tech special-effects wizard using this image-melding movie utility that "melts" one image into another. While using it is simplicity itself, you can only morph still images, and the program suffers from some first-release glitches. **Nov 92**

★★ **Motion Works ProMotion 1.0 (1.03), Motion Works, 604/685-9975, $395.** Inexpensive animation program consolidates a slew of tempting features, including flexible path tools and ambitious support for Apple events, but the capabilities are strung together with a weak and problem-ridden interface. **Nov 92**

★★ **MovieWorks 1.1, Interactive Solutions, 415/377-0136, $395.** Over 100 bugs were fixed in version 1.1 of this multimedia authoring software that takes an all-in-one approach to creating presentations, but problems remain. For now, it's a good idea, poorly executed. **Jun 93**

★★★ **Passport Producer 1.0, Passport Designs, 415/726-0280, $495.** Strong timing controls and good sound capabilities mix with middling text- and image-handling and a lack of even basic animation options in this partially successful entry-level multimedia program. **Apr 93**

★★★ **Special Delivery 1.0 (1.1), Interactive Media Corp., 415/948-0745, $399.** While this entry-level multimedia package has all the tools you need to assemble interactive screen presentations that burst with motion and sound, it has a disorienting interface and lacks the polish and power of other similarly priced programs. **Mar 93**

★★★ **VideoFusion 1.0.1, VideoFusion, 419/891-1090, $649.** Collection of special effects for QuickTime movies may not be for the casual user, but if you have the equipment and you can't live without spinning logos and superimposed shots, then go ahead and indulge. **Jul 93**

PROGRAMMING

★★★ **EdScheme 3.4 (4.0), Schemers, 305/776-7376, $49.95.** This clear, elegant programming language is an excellent tool for learning good programming techniques, although it can't be used to create stand-alone applications. **Nov 92**

★★★ **EISToolKit 2.0, MicroStrategy, 302/427-8800, $1995.** Reliable, field-tested developer's environment for creating executive information systems provides automatic access to information in spreadsheets and databases across a distributed system, and serves up the information on screens that provide automatic graphing, analysis, and report generation. **May 93**

★★★★ **FutureBASIC 1.0, Zedcor, 602/881-8101, $299.95.** Complete, easy-to-learn, real-world programming tool has full Toolbox, System 7, and assembler support. It's a wonderful tool that's rapidly becoming a favorite among commercial developers. **Jul 93**

★★★ **MetaDesign for the Macintosh 3.0, Meta Software Corp., 617/576-6920, $250.** This diagramming tool for structured systems analysis offers easy ways to group and ungroup symbols in diagrams and to show relationships between symbols. It excels at austere, classic flowcharts but could use some flashier features, such as shaded backgrounds, for presentations. **Mar 93**

★★★ **Object Logo Student Edition, Paradigm Software, 617/576-7675, $49.95.** This book-plus-disk package offers a wide-ranging introduction to programming concepts. It's aimed roughly at the high-school educational level and lets you see something happen for every few lines of code you type. **Jul 93**

★★★★ **Object Master 1.0.2, ACI US, 408/252-4444, $395.** Successful combination of the superior object-management facilities typically found in Smalltalk, and a first-rate programmer's editor. Plus it works with the most popular languages: C, C++, and Pascal. **Jan 93**

★★★★ **PG:Pro 1.5, Staz Software, 601/225-**

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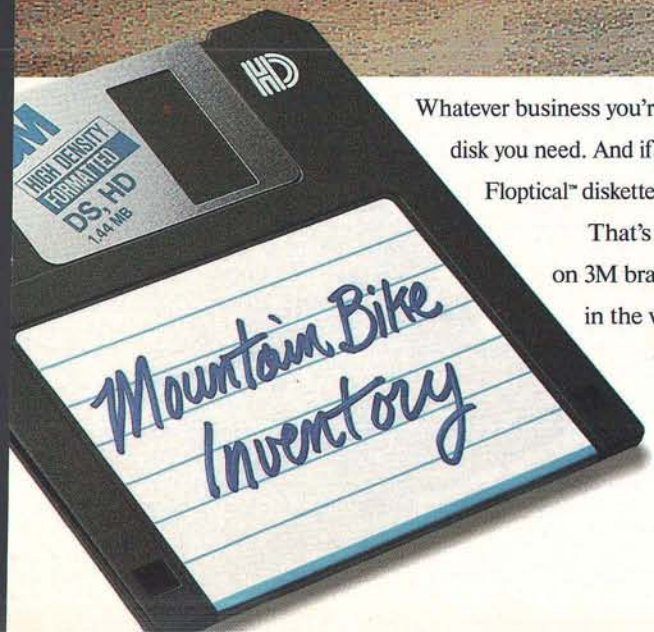

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7085, $169. For part-time or novice programmers, the combination of these BASIC programming tools and FutureBASIC is a fast path to a working program. **Jul 93**

★★★ **Serius Programmer 3.0, Serius Corp., 801/261-7900, $395.** The graphical interface of this application-design environment provides nonprogrammers with tools for creating custom software, but the documentation lacks critical explanations. **Jan 93**

★★★ **SoftPolish 1.1, Language Systems Corp., 703/478-0181, $295.** Program-quality-assurance utility systematically checks the resources in a program's interface against a huge laundry list of errors. It's a programming tool for anyone who hopes to produce a commercial Mac application. **Sep 93**

★★★ **SourceSafe 2.1, One Tree Software, 919/821-2300, $295 to $1195.** Solid, relatively easy-to-use product handles program-development administrative tasks, including version control, for multiplatform programs being created by groups. **Sep 93**

★★★★ **Think C 5.0, Symantec Corp., 408/253-9600, $299.** While not a radical improvement, this is a significant upgrade to an outstanding development tool. Beginners won't find the documentation helpful. **Jul 92**

★★★★★ **Think Pascal 4.0, Symantec Corp., 408/252-3570, $249.** A remarkable achievement—a programming language and environment full-bodied enough for professional programmers while still inviting for neophytes. No weak points and dozens of strengths. **Aug 92**

UTILITIES

★★★ **7th Heaven 2.5, Logical Solutions, 612/659-2495, $99.95.** Seven enhancements to System 7 include a file-copying accelerator, a file-mapping utility, a system-information collector, a screen saver, a simple calendar, a desktop-pattern editor, and a system-alert-icon changer. Our reviewer found them fun and elegantly done, but not all of them were useful. **Jul 93**

★★★ **Alki Seek 2.1, Alki Software Corp., 206/286-2600, $39.95.** Competent file-finding utility scans by file name or content and lets you combine multiple search criteria. It cannot search in the background or find text in compressed files. **Jul 93**

★★★★ **At Ease 1.0 (1.1), Apple Computer, 408/996-1010, $59.** Sweet, simple, secure substitute for the Finder displays a clean, attractive page full of oversize icons where a single click launches a program or document. To delete, rename, or move files, you have to return to the Finder. **Mar 93**

★★★ **AutoDoubler 1.0.7 (2.0.1), Salient Software, 415/321-5375, $89.95.** Designed to operate transparently, this automatic file-compression utility is a practical solution for users short on disk space, but it's missing many of the features of dedicated file-compression utilities. **Sep 92**

★★★ **Billy Steinberg's PBTools 1.0.1, Inline Design, 203/435-4995, $99.95.** If you want basic PowerBook management without added frills or complex menu bar displays, this collection of four utilities may be just your cup of tea. **Jul 93**

★★★ **Chameleon 2.0.3, Logical Solutions, 612/659-2495, $59.95.** Sleek and simple desktop-pattern editor comes with an ample supply of rich, textured color images and a set of limited but functional editing tools. **Sep 93**

★★★★ **ClickChange 2.0, Dubl-Click Software, 818/888-2068, $89.95.** Interface-customizing package has nothing you need but is filled with everything you want, including tools that let you alter major elements (cursors, menu bar, clock, buttons, scroll bars, windows, colors, patterns, and sounds) of the Mac's look-and-feel. **Aug 93**

★★★★ **Conflict Catcher and Other Innovative Utilities 1.0 (1.3.8), Casady & Greene, 408/484-9228, $79.95.** Enable or disable INITs and startup items when you boot, with this INIT manager that comes with four other system-related utilities. Its ability to track down INIT-related problems makes it a worthwhile investment even if you own another INIT manager. **Mar 93**

★★★ **Copyright, CSG Technologies, 412/471-7170, $49.** If you can justify spending $49 purely for the sake of efficiency, this straightforward utility replaces the Finder's copy function, unobtrusively copying files to or from your Mac, in the background, while you move on to more interesting things. **Apr 93**

★★★★ **CPU 2.0, Connectix Corp., 415/571-5100, $99.** Reasonably priced collection of utilities for the PowerBook adds new features, including file synchronization, that easily justify the upgrade price. **Sep 93**

★★★ **DiskFit Direct 1.0, Dantz Development Corp., 510/849-0293, $49.95.** Basic but efficient backup system is simple and painless enough to foster better backup habits in anyone who uses it. It doesn't back up to hard drives or tape drives. **May 93**

★★★ **Drive 7 2.3 (2.34), Casa Blanca Works, 415/461-2227, $79.95.** Universal hard drive updater and formatter has an attractive, uncluttered interface that's so easy to use it makes hard drive maintenance almost relaxing. **Jan 93**

★★ **DynoPage 2.0, Portfolio Software, 408/252-0420, $89.95.** While this utility greatly simplifies the printing of booklets and double-sided pages, it doesn't support PostScript graphics, is incompatible with some popular applications, and has a buggy drag-and-drop feature. **Jul 93**

★★★★ **easyPrint 1.0, SF/O, 408/253-8081, $29.95.** Nifty utility lets you switch printers without using the Chooser. It's a bargain for network users and those who frequently change output devices. **Oct 92**

★★★ **Hard Disk ToolKit Personal Edition 1.1.2, FWB Software, 415/474-8055, $79.** The more arcane features of the heavy-duty Hard Disk ToolKit have been stripped out of this entry-level, non-power-user version, but everything you really need to format, update, partition, and manage your hard drive is included. **Jan 93**

★★★ **Icon 7, Inline Design, 203/435-4995, $79.95.** Simple, straightforward utility has a streamlined and intuitive library feature for storing and retrieving icons, plus tools for icon editing. Its icon collection, however, is pretty paltry. **Sep 93**

★★★ **I Like Icon, Baseline Publishing, 901/682-9676, $59.95.** Glitzy utility has tools for icon editing, has an impressive library of icons, and can create animated icons. Some basic features, such as a text tool, are missing, and the animated icons are fun but impractical. **Sep 93**

★★★ **INITPicker 3.0 (3.02), Inline Design, 203/435-4995, $79.95.** This INIT manager's ability to load aliased INITs over a network will interest network managers. While it disables problem INITs at start-up, it doesn't help you identify the cause of INIT conflicts that don't cause the Mac to crash at start-up. **Mar 93**

★★★★ **Inline Sync 1.0 (1.01), Inline Design, 203/435-4995, $129.95.** Keep the latest version of your work on your portable machine and your desktop Mac with this file-synch software. It's easy to install, easy to use, easy on the wallet, and does the job well. **Mar 93**

★★★★ **KidDesk 1.0, Edmark Corp., 206/556-8484, $39.95.** If you have young children who love to experiment with your Mac while you're busy elsewhere, this desktop environment is a fun way to provide easily navigable play while protecting your files and applications from the havoc that curious little fingers can wreak. **Jun 93**

★★★★ **Kiwi Power Menus 1.0, Kiwi Software, 805/685-4031, $39.95.** Simple little utility adds flexibility to the Apple menu by adding an unlimited number of submenus and enabling you to change the font and size in the menus. **Dec 92**

★★★ **MacPalette II 2.2 (2.3), Microspot USA, 408/253-2000, $69.** You can print images from 8-bit and 24-bit color programs when you use an ImageWriter II with a four-color ribbon and this new driver that approximates halftones by dithering. While the results are less than state-of-the-art, so is the cost. **Sep 92**

★★★★ **MacTools 2.0, Central Point Software, 503/690-8090, $149.** The consistent, 3-D–style interface makes it easy for the inexperienced user to navigate this utility package; the automated hard drive and floppy-disk repair capabilities and antivirus capabilities make it an asset for anyone. **Oct 92**

★★ **Magic Typist 2.0, Olduvai Corp., 305/670-1112, $129.** If you want to speed up typing of repetitive phrases or if you don't have full use of your hands, this utility, which automates typing of repetitive phrases, may be useful, but some functions work erratically or not at all in Microsoft Word. **Sep 93**

★★★★ **Magnet 1.0 (1.01), No Hands Software, 415/321-7340, $129.95.** Automation aids the laborious task of file management with this software. It creates "agents" or "magnets" that trigger in response to user-specified events and automatically look for files and folders to copy, move, or alias. **Feb 93**

★★★★ **MasterFinder 1.2.1, Olduvai Corp., 305/670-1112, $149.** Ingenious finder utility provides rapid access to frequently used files and folders, permits operations on several files at once, and saves catalogs of offline volumes, but the many features require some effort to learn. **Nov 92**

★★★ **More Disk Space 1.1 (2.1), Alysis Software Corp., 415/566-2263, $99.95.** Automatically compress and expand files with this utility. Although it doesn't identify compressed files, and must run as a start-up application to work automatically, it does offer a measure of control that similar utilities lack. **Sep 92**

★★★ **NightWatch II 2.0.1b (2.01c), Kent Marsh, 713/522-5625, $159.95.** Although skillful snoops can override the screen-locker feature of this hard drive security utility, the password protection provides a flexible and safe method of restricting access to anyone turning on your hard drive. **Nov 92**

★★★★ **Nok Nok 1.0 (1.0.4), Trik, 617/933-8810, $49.95.** Plug the security holes that System 7 file sharing created, with this effective file-share monitoring utility that logs people's attempts to connect to your Mac, alerts you when someone does connect, and sets time limits for

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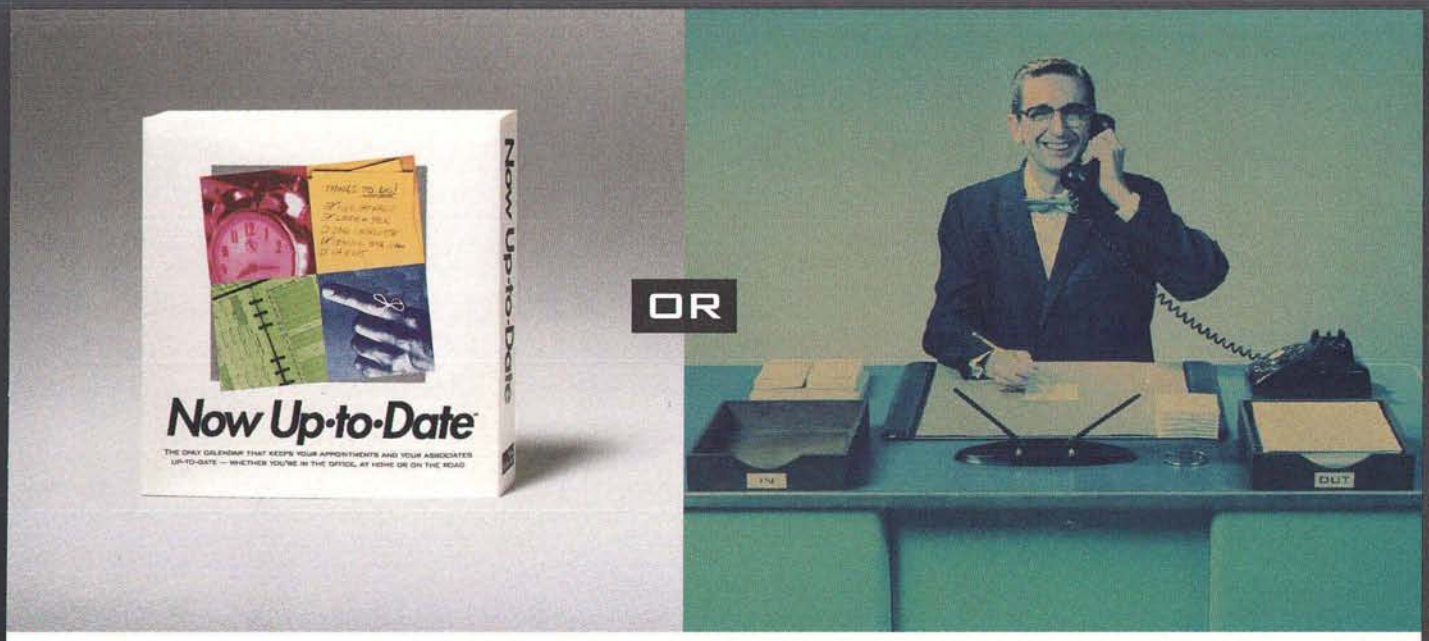

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MACWORLD Star Ratings

file share users. Oct 92

★★★ **Norton Essentials for PowerBook 1.0, Symantec Corp., 310/453-4600, $129.** Uneven collection of a dozen PowerBook utilities ranges from the unique and useful Instant Access module, which automatically turns AppleTalk on and off, to the relatively inaccurate Battery Gauge feature, which purports to tell you the status of your battery. Apr 93

★★★★ **Norton Utilities for Macintosh 2.0, Symantec Corp., 310/453-4600, $149.** Everything-including-the-kitchen-sink utility package does an excellent job of diagnosing and repairing damaged hard drives and floppy disks, but the interfaces of the various components differ wildly. Oct 92

★★★★ **Now Utilities 4.0.1, Now Software, 503/274-2800, $129.** Many thoughtful improvements have been added to this collection of utilities, which is now better integrated, more logically designed, and still an excellent deal for your dollar. The new scrapbook feature, however, is awkward and inconvenient. Aug 93

★★★ **Peace of Mind 1.2.2, Polybus Systems Corp., 716/871-6533, $149.** Hardware diagnostic tool performs exhaustive batch, interactive, and benchmark tests on virtually all major Mac hardware components; does an excellent job of diagnosing simple simulated hardware errors (such as SIMM tweaking). The program has minor bugs and lacks a comparative test-history feature. Jun 93

★★★★ **PicturePress 2.5, Storm Technology, 415/691-6600, $199.** This image-compression software supports every useful storage mode; has new calculation features for improved image fidelity; offers utilities with practical advantages for day-to-day graphics work; and is twice as fast as version 2.0. If you work with images professionally, it's the clear choice. Mar 93

★★★ **PowerMerge 1.0.2, Leader Technologies, 714/757-1787, $129.** File-synchronization utility has a potentially confusing interface, but is a handy means of updating selected files so that different Macs end up with identical versions of the selected documents. Apr 93

★★★ **Public Utilities for the Macintosh 1.0, Fifth Generation Systems, 504/291-7221, $149.** Utility program sticks to the basics of disk diagnosis, disk repair, and file optimization. It does a good, and in some cases unique, job, although disk optimization is slow. The technical support offered by Fifth Generation is excellent. Jun 93

★★★ **RapidTrak 1.0.1, Insignia Solutions, 415/694-7600, $99.95.** If you've got RAM to spare, this hard drive formatter offers driver-level RAM caching to store frequently used data and improve performance, especially on slower-speed drives. May 93

★★★ **Retrieve It 1.0, Claris Clear Choice, 408/987-7000, $49.** It's great that this nonindexed file-finding utility allows you to search by file name as well as by text, but it is definitely slower than indexed searching. Nov 92

★★★★ **Retrospect 2.0, Dantz Development Corp., 510/849-0293, $249.** Powerful backup and archiving software has an improved interface and scripting capabilities, and works well for all levels of users. Sep 93

★★★★ **Retrospect Remote 2.0, Dantz Development Corp., 510/849-0293, $449.** Utility allows fast, automatic backup of networked Macs to a central Mac with a backup device. It worked flawlessly in our reviewer's tests. Sep 93

★★★ **Safe and Sound, Central Point Software, 503/690-8090, $49.95.** Limited but useful disk-protection and -salvage utility has a clean, simple interface and is an efficient emergency recovery tool. Jun 93

★★ **SafeDeposit 1.2, Dayna Communications, 801/269-7200, $189.** Automated backup program is easy to set up but slow. Also, unattended backups must be restarted from scratch if disk space runs short and a new disk isn't inserted. Sep 93

★★★ **Silverlining 5.4, La Cie, 800/999-3919, $149.** Extensive and detailed testing is only one of many advanced functions offered by this hard drive–management utility. The interface is lackluster and apt to confuse beginners. Jan 93

★★★★ **SnapBack 1.0, Golden Triangle Computers, 619/279-2100, $129.** For regular day-to-day backups, this network backup software is a great choice. Its strength lies in its simplicity and its easy-to-use, one-window interface, but it requires a dedicated hard drive. Dec 92

★★★ **SpeedyCD 1.2.2 (1.2.4), ShirtPocket Software, 602/966-7667, $70.** Get Info gets faster with this CD-ROM–access accelerator that creates a database of files from a CD and puts it on your hard drive. If you regularly browse through the same CD-ROM folders, this product might save you enough time for it to be worth the $70. Nov 92

★★★ **Square One 1.5.2, Binary Software, 310/582-8293, $74.** Flexible, attractive icon-based file launcher provides infinitely customizable palettes, including one that displays active applications. The manual could use some help, and the application will consume 400K of your system memory. Aug 93

★★★★ **Star Trek: The Screen Saver, Berkeley Systems, 510/540-5535, $59.95.** Go where no Mac has gone before with this screen saver based on the original "Star Trek." Modules vary from simple messages in "Trek"-inspired fonts to an endless parade across the ship's main screen of aliens, spacecraft, and artifacts from different episodes. May 93

★★★★ **Star Wars Visual Clips, Sound Source Unlimited, 805/494-9996, $89.95.** Control panel lets you play QuickTime movie clips from *Star Wars* at system events. If you have the money, the hard drive space, and the RAM, this is the kind of totally cool toy that will make you remember why you love your Mac. Sep 93

★★★★ **StuffIt Deluxe with SpaceSaver 3.0, Aladdin Systems, 408/761-6200, $120.** Its many conversion tools, able feature set, automatic compression capabilities, reliability checks, and acceptable performance make this product the jack-of-all-trades of compression utilities. Aug 93

★★★ **Super 7 Utilities, Atticus Software, 203/324-1142, $99.95.** Collection of seven control panels/extensions adds some ease of use to System 7, although none of its functions are essential. Modules perform tricks such as turning any menu into a tear-off palette, and randomizing the sounds that play in response to errors. Apr 93

★★ **SuperDuper 1.7, NeoConcepts, 408/899-4821, $79.** If you're sick of duplicating disks with the Finder, this utility is an acceptable alternative, but there are other utilities that are better, cheaper, and do the same thing. Nov 92

★★ **TimesTwo 1.0.1, Golden Triangle Computers, 619/279-2100, $149.** Automatic disk-compression utility operates at the disk-driver level rather than as an operating system add-on. A number of quirks, such as its ungraceful handling of full disks, are problems. May 93

★★★★ **UpDiff 1.0, KyZen Corp., 609/354-3863, $169.** Innovative program compares two versions of a file, extracts the differences, and creates a difference file that is typically smaller than the original and can be used to update the older file. Dec 92

★★★ **Virtual 3.0.1, Connectix Corp., 415/571-5100, $99.** If you need to eke out as much virtual memory speed as possible, this utility may be a useful tool. For System 6 users who want virtual memory, it's the only game in town. Sep 93

★★★ **Voice Navigator SW 2.3, Articulate Systems, 617/935-5656, $399.** Talk back to your Mac (if it has built-in sound input) with this speech-recognition software. Defining macros that respond to voice commands can be frustrating, but the product is a real boon for disabled users. Jan 93

★★★ **WonderPrint 1.0, Delta Tao Software, 408/730-9336, $59.** StyleWriters and DeskWriters produce halftones good enough for newsletters with this printing extension that improves the output of QuickDraw printers and accelerates printing of pictures on PostScript printers. Jan 93

VERTICAL MARKETS

★★★ **Compare-A-Loan 4.0.2 (4.1), Softflair, 612/894-3357, $79.95.** Although geared to professionals, this product for home-loan evaluation provides thorough documentation and is structured so that anyone can use it. Its reports compare payback schedules of various home-loan options. Apr 93

★★ **ConstructionMac 1.2 (2.5), Revelar Software, 801/485-3291, $159.** With a lot of work from you, this software will organize your construction or remodeling project. Oct 92

★★★★ **Diet Balancer 1.0 (1.05), Nutridata Software Corp., 914/298-1308, $69.95.** Easy-to-use personalized weight-planning tool includes a database of nutritional values and standard serving sizes, and is useful for home diet-planning. Dec 92

★★★ **Expert Home Design 1.0 (1.0.3), Expert Software, 305/567-9990, $49.95.** You can quickly and easily create home- or office-interior layouts that are precise, but not as detailed as blueprints, with this interior design software that includes a large furniture library. It doesn't do automatic side views, or offer ⌘-*key* access to library objects, but it's a good value nonetheless. May 93

★★ **Expert Landscape Design 1.0 (1.0.2), Expert Software, 305/567-9990, $49.95.** Barebones drawing environment for experimenting with landscape design is inexpensive, but its usefulness is severely limited because of awkward color and pattern tools and because it doesn't identify plant types. Feb 93

★★★★ **Grade Machine 5.0, Misty City Software, 800/795-0049, $79.** Teachers' lives get easier with this software that quickly sets up a useful electronic grade book. Program includes networking capabilities plus dozens of options for printing reports. Dec 92

★★★ **JobTracker 2.02 (2.5), InfoSolutions, 814/355-2983, $395 to $844.** Designed specifically

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Actually, what you see here is far more than just a box. Our Orientation Kit is your entree to the Apple® Multimedia Program and your direct link to the future of multimedia. So, whether you're a designer, developer, educator, publisher or marketer—or just looking to get involved—you should get with the Apple Multimedia Program. An annual membership fee connects you to some of the best minds and most successful members of the multimedia community. For starters, we'll send you the Apple Multimedia Orientation Kit plus an ongoing supply of valuable tools, information and updates. Membership includes special discounts, a personal AppleLink® address and a "Members Only" bulletin board that lets you tap into technical and marketing tips and techniques. You'll receive how-to guidebooks and videos with advice from proven developers. You'll see how businesses are using multimedia to be more effective and productive in their operations. You'll get key market research reports, so you'll know where the opportunities are. There's even a directory of multimedia products and services, so you can find exactly what you're looking for.

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Apple Multimedia Program

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MACWORLD Star Ratings

for publication management, this scheduling and project-management software isn't completely polished, but it manages the job competently. **Dec 92**

★★★ **LoanLease Library 3.0.3 (3.05), Softflair, 612/894-3357, $99.95.** If you are generating a loan or a lease and need to keep track of payments, this well-documented program for loan evaluation is a worthwhile investment, despite its minor eccentricities. **Apr 93**

★★★ **Making the Grade 2.0 (2.2), Jay Klein Productions, 719/591-9815, $99.95.** The Macintosh version of the Apple II program Grade Busters 1/2/3, this grade-book software with dozens of reporting options is easy to learn; but if you're already spreadsheet-literate, the friendly dialog boxes and reminders may get in the way. **Dec 92**

★★★ **Nutri-Calc Plus 1.2, Camde Corp., 602/926-2632, $159.** Designed for knowledgeable and serious users, this powerful, flexible program manages nutrition information and analyzes diets. **Dec 92**

★★★ **Roll Call 2.0, By the Numbers, 603/927-4508, $495.** 4th Dimension database application for church management helps track donations, attendance, church-group membership, and visitation. While not a complete church-management system, it's an acceptable complement to a general accounting program. **Aug 93**

★★★ **Stat-Ref 3.2a (3.2b), Teton Data Systems, 307/733-5494, $95.** Medical database on CD-ROM lets you search by keyword. Because it provides access to limited sets of journal citations, it's not suitable for research, but it could effectively replace a small reference library in an office. **Jan 93**

WRITING TOOLS

★★ **Correct Writing 2.0, Wordstar International, 415/382-8000, $49.** For those who are unsure of the elements of style, this online reference is convenient and comparatively inexpensive, but it is far from complete. **Sep 92**

★★★ **DocuComp II 1.0 (1.05), Advanced Software, 408/733-0745, $179.95.** Document-management utility compares text in two versions of the same file and reports the differences in a comprehensive, easy-to-follow format. **Nov 92**

★★★★ **EndNote Plus 1.2 (1.3), Niles and Associates, 510/649-8176, $249.** Reference database and tool for creating citations and bibliographies is now accessible from within Microsoft Word 5.0, a significant enhancement to an excellent product. **Sep 92**

★★★★ **Final Draft 2.0 (2.0.3), MacToolkit, 310/395-4242, $349.** Script-writing gets simpler with this well-conceived software that automates formatting of different elements in a script, including dialogue, action, and slug lines (scene headings). Customization is easy, and macros automate typing of common phrases such as "fade to black." **Apr 93**

★★★ **IdeaFisher 2.0, Fisher Idea Systems, 714/474-8111, $595.** Inspiration never comes easily, but this creativity tool with a question bank of 6000 questions and an idea bank of 61,000 words and 700,000 links might help get the juices flowing. **Jan 93**

★★★ **Just Joking 1.0, WordStar International, 415/382-8000, $49.** HyperCard stack of around 2800 humorous quotations offers a serviceable selection of sayings from a diverse group of humorists, comedians, philosophers, and writers, among others. **Apr 93**

★★★ **LetterPerfect for Macintosh 2.1, WordPerfect Corp., 801/225-5000, $149.** Stripped-down version of WordPerfect measures up as a serviceable low-end word processor, with clean, accurate documentation and an uncluttered interface. **Jan 93**

★★★★ **MacWrite Pro, Claris Corp., 408/987-7000, $249.** Many of the new features of this upgrade are very well executed, including the easy-to-use table feature, simple but elegant palettes, and an almost pain-free mail merge feature. The program could still use some polish, however. **Jul 93**

★★ **MasterWord 5.1, Alki Software Corp., 206/286-2600, $99.95.** The centerpiece of this package of add-on Microsoft Word commands is a set of customizable tool bars that are obviously the product of a lot of thought and effort. Unfortunately, rough edges remain, including inaccuracies in the documentation and some features that don't work as advertised. **Aug 93**

★★★★ **Microsoft Word 5.1, Microsoft, 206/882-8080, $495.** Small, solid upgrade fine-tunes some plug-in modules and adds new modules including an icon tool bar, text annotation, and other features. The numerous minor enhancements make it worth the upgrade price, but it won't give Word 5.0 users goosebumps. **Mar 93**

★★★ **RightWriter for the Mac 5.0, Que Software, 317/573-2500, $99.95.** Grammar checker looks at writing style, word usage, punctuation, and capitalization, as well as grammar. Customizable writing-style filters and multiple approaches to analysis are nice, but—as with all grammar checkers—not all of the program's advice is great. **May 93**

★★★ **ShowScape 4.1, Lake Compuframes, 914/941-1998, $429 to $679.** This script-writing software formats scripts in either screenplay format or dual-column format (for audio and video) and allows you to choose the number of shots displayed per page, but it requires you to own and work in WordPerfect. **Apr 93**

★★★ **TypeReader 1.0, ExperVision, 408/428-9988, $695.** Speed and accuracy combine with a straightforward operating style in this high-end optical character-recognition software that doesn't do everything its competition does, but is a major contender nonetheless. **Feb 93**

★★★ **VersionMaster 1.5, AStar Technologies, 508/486-8532, $199.95 to $1199.95.** Document-management utility helps you archive and track versions of a file by maintaining a database of altered documents. It's recommended only for workgroups that routinely follow check-out procedures and that don't need detailed reports of the changes to a file. **Apr 93**

★★★ **WordPerfect for Macintosh 2.1 (2.1.3), WordPerfect Corp., 801/225-5000, $495.** Play QuickTime movies in your text files or publish and subscribe with this upgrade. It continues to provide the best desktop publishing and graphics capabilities of any word processor, but it lacks glossary- and table-creation features. **Jun 92**

★★★★ **WriteNow 3.0, WordStar International, 415/382-8000, $119.** The streamlined approach of this low-end word processor will appeal to many Macintosh users, especially the storage-conscious. A nice mix of features includes impressive implementation of style sheets. **Sep 92**

Hardware

INPUT DEVICES

★★★ **Acecat for Macintosh, AceCAD, 408/655-1900, $149.** It's the hands-down winner in the digitizing-tablet price competition, but although this product works well, it lacks some of the amenities of higher-end tablets. **Aug 92**

★★ **Apple Adjustable Keyboard, Apple Computer, 408/996-1010, $219.** Adjustable keyboard is a slight improvement on the flat slab keyboard, but hopefully it won't be the last. Theoretically, it corrects a crook in the wrist known as ulnar deviation, but many sufferers of repetitive stress injuries are still hoping for a keyboard that adjusts on a vertical plane. **Jul 93**

★★★★ **ArtZ ADB Tablet, Wacom Technology Corp., 206/750-8882, $449.** Combining pressure-sensitive operation, manageable size, and a new pencil-thin stylus, this affordable digitizing tablet is perfect for artists looking for traditional-style control of their graphics programs. **Aug 93**

★★★★ **The Bat, Infogrip, 504/766-8082, $495.** Right- and left-hand keypads slant the little fingers down and the thumbs up, with built-in wrist rests. Our reviewer considered it the best ergonomic device she'd seen; the downside is learning to type all over again. **Oct 92**

★★★ **Mouse-Trak, Itac Systems, 214/494-3073, $179.** Well-positioned, easy-to-rotate trackball with a soft wrist-pad is comfortable to use, but must be disassembled to reconfigure the buttons. **Nov 92**

★★★★ **Turbo Mouse 4.0, Kensington Microware, 415/572-2700, $169.95.** Large buttons on either side of this trackball provide just the right measure of tactile feedback; the removable ball glides freely. But the breakthrough feature is the software that lets you customize many of the trackball's functions. **Nov 92**

★★★ **The UnMouse, MicroTouch Systems, 508/659-9000, $199.** Input device is a cursor-control device, programmable keypad, and small graphics tablet in one, and can be programmed with 60 macros (although only 16 can be selected by sight). It's ergonomically better than a mouse, but not as good as a trackball. **May 93**

★★★ **Z-Nix Cordless SuperMouse, DynaPoint, 818/854-6440, $99.** Sleek and attractive cordless mouse works reliably and is attractively priced, but suffers from the same line-of-sight limitations as other infrared devices (such as TV remote controls). **Dec 92**

MISCELLANEOUS HARDWARE

★★★ **ACS300 Computer Speaker System, Altec Lansing Consumer Products, 717/296-4434, $400.** Clamshell-shape high/midrange speakers come with a freestanding subwoofer and power supply. The sound is rich and smooth, but the cabling is nonstandard, and there is no on/off switch. **Nov 92**

★★★★ **Apple Color OneScanner, Apple Computer, 408/996-1010, $1349.** Tests of this impressive color scanner demonstrate unpolluted colors and sharp image details, perhaps due to color filters and lenses that Apple claims were specially designed and tuned for the scanner. **Jul 93**

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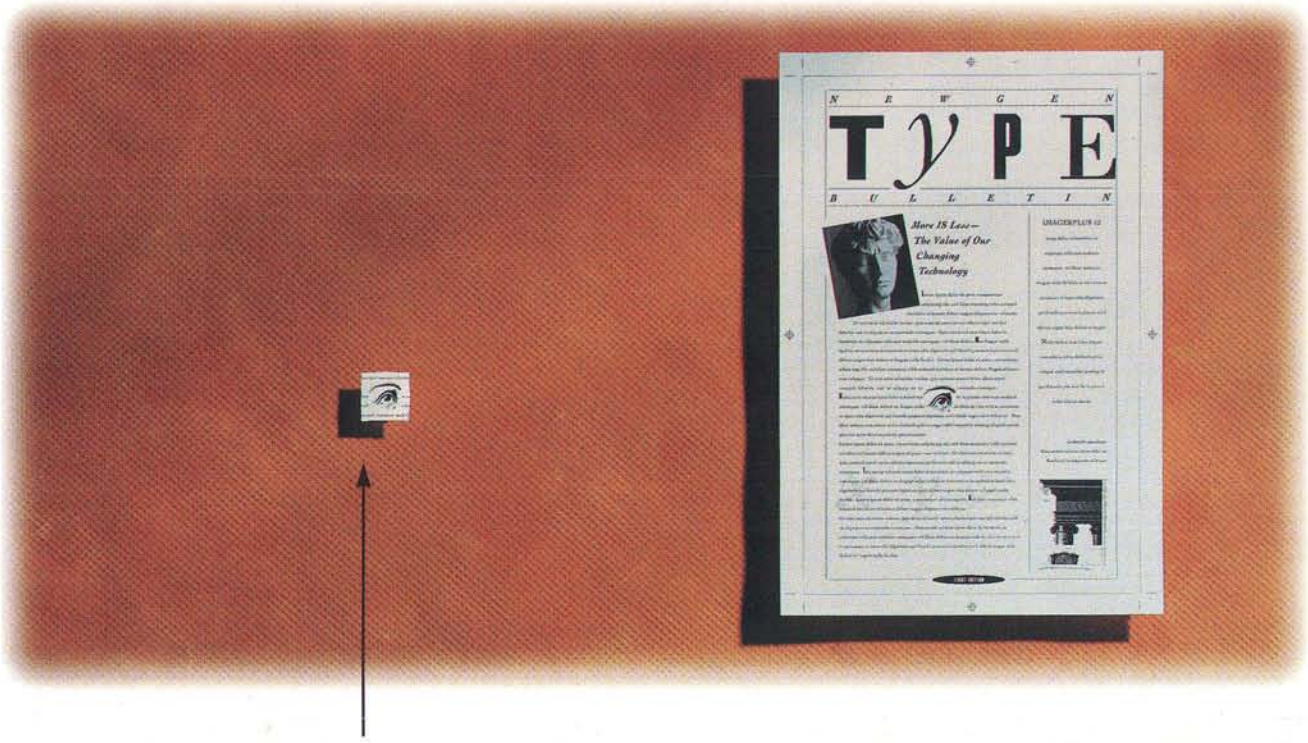

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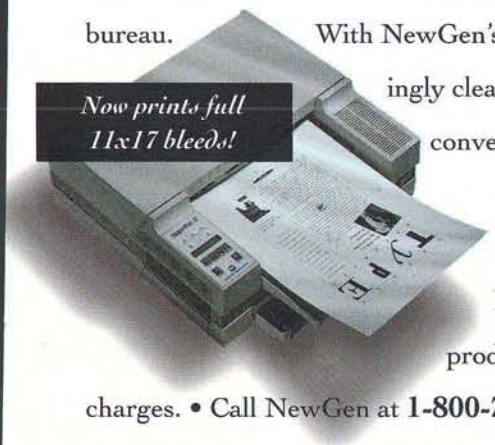

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MACWORLD Star Ratings

★★★★ **AppleCD 300, Apple Computer, 408/996-1010, $599.** Double-speed CD-ROM drive spins its discs at twice the speed of earlier drives, providing faster access to large files. It also reads multisession Photo CDs. **Jun 93**

★★★ **EMBARC, Embarc Communications Services, 407/364-2000, $395 plus fees.** If you're a PowerBook user who is frequently in places with no telephone and you need timely delivery of electronic news and E-mail, this portable wireless message service may prove useful, but the cost may be prohibitive to others. **Sep 93**

★★★★ **Epson ES-800C, Epson America, 310/782-0770, $1499; Macintosh interface kit $399.** Flexible 400-dpi scanner offers a range of options, including one- or three-pass scanning, plus a full-featured, easy-to-use software package that includes a Photoshop plug-in, a QuarkXPress extension, and a desk accessory that lets you scan an image from the Apple menu. **Aug 93**

★★★★ **HP ScanJet IIP, Hewlett-Packard, 800/752-0900, $879.** An elegant piece of technology, this desktop gray-scale scanner produces excellent results for a street price of around $750. Muddled online help and a flimsy hinge are minor problems. **Aug 92**

★★★★ **Media Control Station 1.0 (1.01), JLCooper Electronics, 310/306-4131, $269.95.** This versatile tool connects to the Mac through an ADB port and offers an easy and intuitive way to cue and edit QuickTime movies, MIDI files, multimedia playlists, and other dynamic data. **Feb 93**

★★★★ **The Miracle Piano Teaching System 1.0, Software Toolworks, 415/883-3000, $419.95.** Painstakingly crafted music and piano instructor comes with keyboard, software, and 120 songs, including classical, movie-theme, and rock. The program offers encouragement and advice, and ends every lesson with a synthesized orchestra accompaniment. **Oct 92**

★★★★ **The Mouse Yoke, Colorado Spectrum, 303/225-6929, $34.95.** Gadget turns an ordinary mechanical mouse into an aircraft-style steering wheel, or yoke, for use with flight simulators. Elegantly executed concept uses quality materials; device is not appropriate for driving simulations or shooting games. **Dec 92**

★★★★ **Nikon LS-3510AF Film Scanner, Nikon, 516/547-4355, $9535 to $11,316.** The bread-box–style design of this 35mm film scanner may be reminiscent of past models, but many changes make it faster and more convenient. Still, advanced users won't be satisfied with the tools for overriding automatic exposure and tone adjustments. **Sep 92**

★★★ **Organizer Link II (Model OZ-893), Sharp Corp., 800/321-8877, $129.99.** If you own a 5000-, 7000-, or 8000- series Sharp Wizard, this program and cable let you connect it to a Macintosh serial port to exchange data. It's functional, but has some minor weaknesses. **Jan 93**

★★★ **PhonePro 1.0.3 (1.1.5), Cypress Research Corp., 408/752-2700, $950.** Application makes it relatively easy to develop a multiple-choice voice-mail system using your Mac, especially for those with programming backgrounds. The product includes a 9600-bps modem and a headset/microphone. **Feb 93**

★★★★ **PowerKey 2.0 (2.01), Sophisticated Circuits, 206/485-7979, $119.** Ingenious, automated power strip has four surge-protected outlets controlled by the keyboard's on/off switch. The clever software can turn on a Mac, unattended, run a QuicKeys macro (QuicKeys Lite included), and shut down again. **Dec 92**

★★★ **ScanPlus Color 6000 for Mac, PlusTek USA, 408/980-1234, $749 to $899.** Small, inexpensive sheetfed color scanner is not appropriate if exact color matching is critical, but it is otherwise a good, economical option. **Sep 93**

★★★ **Yamaha TG100, Yamaha Corp. of America, 714/522-9011, $449.** Compact, keyboardless, multitimbral MIDI synthesizer with built-in MIDI interface adheres to the life-simplifying General MIDI standard patch arrangement. Although it won't convince you that you're hearing a live orchestra, the sound is about as realistic as low-cost MIDI gets. **Apr 93**

MODEMS/NETWORK HARDWARE

★★ **EtherPrint 1.0 (2.0), Dayna Communications, 801/531-0600, $499.** It's possible to connect a single LocalTalk printer to an Ethernet network using this device, but it's an expensive option. **Dec 92**

★★★ **EtherPrint Plus, Dayna Communications, 801/531-0600, $599.** Support four LocalTalk products on an Ethernet network using this device that can also serve as an inexpensive AppleTalk router. **Dec 92**

★★★★ **EtherWrite, Compatible Systems Corp., 303/444-9532, $695.** Elegant and cost-effective device with excellent network-management software allows up to six LocalTalk products to connect to an Ethernet network. **Dec 92**

★★★★ **PathFinder, Dayna Communications, 801/531-0600, $899.** For simple networks, this LocalTalk-to-Ethernet router is a great value, as well as a great time-saver for beginning network managers. It uses AppleTalk only. **Jan 93**

★★★ **PowerModem, PSI Integration, 408/559-8544, $299.** Superior fax software distinguishes this fax/data modem for PowerBooks, but it's not the best choice for those who do a lot of online work that requires a high-speed data modem. **Jul 92**

★★★★ **PowerPort/Gold, Global Village Communication, 415/329-0700, $499.** If you need 14,400-bps throughput, this data/fax modem is a champ. Its improved software and packaging raise the standards for PowerBook modems. **Dec 92**

★★★★ **Sportster 14,400 Fax/Data Modem, U.S. Robotics, 708/982-5001, $329.** Several nice features, including an easily accessible power button and a front-mounted volume-control dial, make this 100 percent Mac-ready, 14,400-bps fax/data modem better than average. **Feb 93**

★★★★ **SupraFaxModem V.32bis, Supra Corp., 503/967-2400, $399.95.** Send and receive faxes and data at speeds up to 14,400 bps with this attractively priced fax/data modem. The software works well; tech support is adequate. **Aug 92**

★★ **Ultima Home Office, Prometheus Products, 503/692-9600, $499.** When it can reliably transmit data at high speeds and the bugs are fixed, this fax modem with voice mail will be worth a second look. **Oct 92**

★★ **Viva 14.4/Fax, Computer Peripherals, 805/499-5751, $299.** In data mode, this 14,400-bps fax/data modem performed well, but the software bundled with it is barely adequate. **Jan 93**

★★ **WorldPort 9600 MNP5, U.S. Robotics, 708/982-5001, $499.** Only slighter larger than a deck of cards, this 9600-bps modem is geared toward PC users, with a user guide that never mentions Macs and software that is only for PC compatibles. **Jan 93**

PRINTERS

★★★ **Apple Color Printer, Apple Computer, 408/996-1010, $2349.** If you need large-format color output, but not precision color-matching, this well-built printer is a reasonable choice, although it doesn't support PostScript. If you can do without the large-format output, you can find comparable printers at a better price. **Aug 93**

★★ **C. Itoh ProWriter Printer, C-Tech Electronics, 714/833-1165, $2395.** Not only is this laser printer more expensive than most personal page printers, it also offers less-impressive features and so-so output. **Nov 92**

★★★★ **DEClaser 1152, Digital Equipment Corp., 508/493-5111, $999.** Four-pages-per-minute, 300-dpi, PostScript Level 2 printer offers simultaneous support for Macs and PCs, plus excellent image quality, for a ground-breaking price. The internal font set is small, and the included 2MB of memory is not enough to print complex images. **May 93**

★★★★ **HP LaserJet 4M, Hewlett-Packard, 800/752-0900, $2399.** An Intel i8960 RISC processor makes printing complex images faster than ever with this 600-dpi printer, while the Canon LBP-EX print engine and microfine toner guarantee smooth curves and crisp characters. An autoswitch feature makes it a flexible option for mixed-platform offices. **Feb 93**

★★★ **HP PaintJet XL300, Hewlett-Packard, 800/752-0900, $2795.** The output of this color inkjet printer won't satisfy demanding graphic arts professionals, but it's great for business users interested in punching up their presentations. **Oct 92**

★★★★ **IBM LaserPrinter 10A, IBM Corp., 800/358-5835, $2499.** Beautifully defined text, razor-sharp line art, clear gray tones—the output from this large, awkwardly designed, 600-dpi PostScript printer is dazzling, and all for under $3000. **Aug 92**

★★★ **LaserWriter Pro 600 and 630, Apple Computer, 408/996-1010, $2099 to $2529.** From their paper handling to their print quality, these laser printers are Apple's best, as well as the best available in their price range. Unfortunately, they don't support emulation-sensing, and thus may be less desirable for mixed-platform offices than other possibilities. **Jun 93**

★★★★ **LaserWriter Select 300, Apple Computer, 408/996-1010, $839.** Inexpensive, low-capacity printer is networkable, and an excellent buy, despite a few weaknesses. Add a 4MB SIMM to take advantage of the amazing PhotoGrade capabilities, which allow the printer to generate 91 shades of gray. **Aug 93**

★★ **LaserWriter Select 310, Apple Computer, 408/996-1010, $1099.** This big, slow printer is a true Adobe PostScript printer with both Mac and DOS ports, but it's not networkable or compatible with the Communications Toolbox, it can't automatically switch ports, and it doesn't have adjustable paper guides or a preview feature. **Aug 93**

★★★★ **LZR 1560, Dataproducts Corp., 818/**

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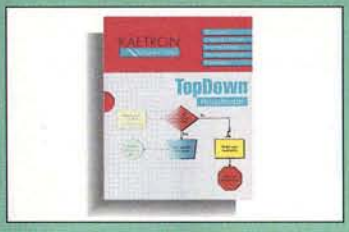

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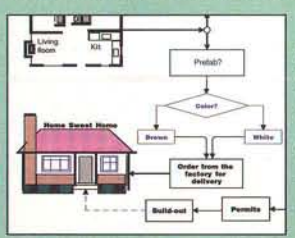

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MACWORLD Star Ratings

887-8000, $3395. Tabloid-size 400-dpi laser printer blazed through our standard printer speed tests and produced output noticeably better than that of 300-dpi printers. It's a good choice for a mixed network. **Sep 92**

★★★★ **LZR 960, Dataproducts Corp., 818/887-8000, $2195.** This peach of a personal PostScript printer is compact, fast, and produces excellent output. Our reviewer experienced low-memory error messages, but most memory problems should be solved with the current shipping configuration of 3MB of RAM. **Jul 92**

★★★ **Phaser 200i Color Printer, Tektronix, 503/682-7377, $5995.** This thermal-wax color printer is fast and compact, with versatile paper-handling features. TekColor image-enhancement technologies provide excellent output quality that is, however, poor on letterhead and inexpensive photocopier bond. An additional $99 paper cassette is required to use plain paper. **Aug 93**

★★ **PrintPartner 10W, Fujitsu Computer Products, 408/432-6333, $2450.** While this multiplatform printer is fast, relatively inexpensive, and prints clearly, many Macintosh users will find it more frustration than it's worth; it can't print TrueType fonts that are not stored internally, including some that are shipped as part of System 7. **Jul 93**

★★★ **RasterOps CorrectPrint 300, RasterOps Corp., 408/562-4200, $8999.** The cost of high-quality, photo-realistic color printing takes a nosedive with this 300-dpi, dye-sublimation printer. The relatively small (8.1 by 8.6 inches on letter-size media) print area is the only significant flaw. **Oct 92**

★★★★ **RealTech Laser 400, Hardware That Fits, 409/760-2400, $3195.** Exactly the same tabloid-size, 400-dpi printer as the Dataproducts LZR 1560, but for slightly less money. And it produces output that is perceptibly better than that of 300-dpi printers. **Sep 92**

★★★★ **StyleWriter II, Apple Computer, 408/996-1010, $359.** Apple's ink-jet printer retains the best features of its predecessor, but costs less. New features, such as gray-scale printing and the ability to share the printer over a network, make it even more versatile. **Jun 93**

★★★ **TI microLaser Turbo, Texas Instruments, 800/527-3500, $1649.** An enhanced version of TI's microLaser Plus, this PostScript Level 2 printer is an admirable performer and a dependable machine, but it leaves you wondering whether the extra $500 is worth it. **Jul 92**

★★★ **WideWriter, GCC Technologies, 617/275-5800, $1699.** Large-format output comes in a reasonably priced package with this ink-jet printer that can automatically feed sheets as large as 14 by 91 inches or manually feed sheets 17 inches wide with an unlimited length. **Feb 93**

★★★ **WriteMove II, GCC Technologies, 617/275-5800, $599.** Portable printer for the PowerBook measures 11½ by 2 by 3½ inches and weighs 2½ pounds. It's no speed demon, but it's fine for short jobs. **May 93**

SYSTEMS/STORAGE

★★★★ **DataPak 105, Mass Microsystems, 408/522-1200, $949 to $1049.** Well-built 105MB SyQuest drive comes with a decent, no-frills cartridge-formatting package and a copy of 7th Heaven. The preformatted cartridges have a lifetime warranty. **Sep 93**

★★★★ **FastCache Quadra, Daystar Digital, 404/967-2077, Quadra 950/900/700 version $449, Quadra 900/700 version $299.** PDS board provides 128K of secondary cache for a Quadra with 15ns static RAM (25ns on 900/700). The average real-world speed improvement is 15 percent, but some operations benefit more from the cache card than others. **May 93**

★★★★ **Floptika 20/M, Procom Technology, 714/852-1000, $545.** It is easy to recommend this floptical drive due to its speed, relatively low cost, bundled software, and lack of problems. Although it allows invalid SCSI ID addresses, it's a fine product. **Sep 92**

★★★★ **Infinity 105 Turbo, Peripheral Land, 510/657-2211, $795 to $894.** Small, light, quiet, inexpensive 105MB SyQuest drive is ingeniously packaged and ideal for both desktop and PowerBook use. **Sep 93**

★★★ **Infinity Floptical 21MB, Peripheral Land, 510/657-2211, $582.** This floptical drive's good points include extensive documentation, switchable termination, and an autoeject function. Bad points are the odd size, the incompatibility of the bundled software with System 7, and inappropriate formatting of 800K disks. **Sep 92**

★★★ **Infinity Optical 3.5, Peripheral Land, 510/657-2211, $1999.** If you need the extra measure of permanence that magneto-optical storage provides—or a compact alternative to bulky cartridges—this drive, based on a Sony mechanism and using 3½-inch disks that store 120MB of data, deserves a look. **Jun 93**

★★★ **Macintosh Centris 610, Apple Computer, 408/996-1010, 4/80 $1859.** Slim-design Mac uses a 20MHz 68LC040 processor at a price-to-performance ratio that comes close to competing with Windows PCs; however, its expandability is severely limited. **Jun 93**

★★★★ **Macintosh Centris 650, Apple Computer, 408/996-1010, 4/80 68LC040 $2699.** Moderately priced but fast 040 system offers three expansion slots and one drive bay, and (except for the base model) has built-in Ethernet, video circuitry, and a math coprocessor. This desktop Mac is as powerful as a Quadra 700 and two times as fast as a IIci. **Jun 93**

★★★ **Macintosh Duo Dock, Apple Computer, 408/996-1010, $1079.** Immensely clever desktop-Mac–size housing for the Duo laptops provides back-panel connectors, a SuperDrive, electrical and physical support for external monitors, and two expansion slots. Although the Duo Dock is easy to like, some details, such as the difficulty of installing NuBus boards, belie Apple's usual attention to detail. **Mar 93**

★★★★ **Macintosh LC III, Apple Computer, 408/996-1010, 4/80 $1349.** Base system comes equipped with a 25MHz 68030 processor, 4MB of RAM soldered to the logic board, an 80MB internal drive, and 512K of VRAM. This is a machine that fits the bill and the pocketbook of most home or small-business owners. **Jul 93**

★★★ **Macintosh PowerBook 145, Apple Computer, 408/996-1010, 4/40 $2149.** Adequate but essentially outdated notebook computer is an upgraded version of the discontinued PowerBook 140 with a faster 25MHz 68030 CPU, but RAM expansion is limited, and it doesn't have a built-in video port. **Feb 93**

★★★★ **Macintosh PowerBook 160, Apple Computer, 408/996-1010, 4/40 $2429.** A built-in video port and gray-scale capability are the new features Apple offers with this notebook computer. While it offers good processing speed and power, the passive matrix display doesn't cut it for all-day use. **Feb 93**

★★ **Macintosh PowerBook 165c, Apple Computer, 408/996-1010, 4/80 $3399.** The passive

matrix screen of this color notebook computer is dull and has noticeable afterimages, but if your expectations are reasonable, the speedy processor provides a pleasant environment in which to work. **Jul 93**

★★★★ **Macintosh PowerBook 180, Apple Computer, 408/996-1010, 4/80 $4109.** An active matrix screen and a math coprocessor are the only differences between this notebook computer and the PowerBook 160, but the beautiful display is worth the extra $1000. **Feb 93**

★★ **Macintosh PowerBook 180c, Apple Computer, 408/996-1010, 4/80 $4169.** The active matrix screen of this color notebook computer is beautiful but so small that its usefulness is very limited. **Sep 93**

★★★★ **Macintosh PowerBook Duo 210 and 230, Apple Computer, 408/996-1010, 210 (4/80) $1839, 230 (4/80) $2299.** Apple's smallest computers have the pleasing heft, size, and shape of hardbound books but pack the horsepower of 030 chips. Although the screen, keyboard, and trackball (more of a "trackmarble") feel small, these computers virtually cry out to be picked up, handled, and used. **Mar 93**

★★★★ **Macintosh Quadra 800, Apple Computer, 408/996-1010, 8/230 $4679.** Squat, yet curvy and attractive, this minitower system has fewer expansion opportunities than the Quadra 950, but just as much power. It's fast, slick, and moderately priced. **Aug 93**

★★★ **MicroMac Plus Upgrade System, MicroMac, 714/362-1000, $998.** This 68030 accelerator for the Mac Plus requires disassembling a Plus and using the Plus system board to assemble the MicroMac system. It speeds up the Plus dramatically, and supports an included external full-page monochrome monitor. **Jun 93**

★★★★ **MultiDisk 150, Iomega, 801/778-1000, $1225.** Durable cartridges are one of the strongest reasons to choose this Bernoulli removable drive. Although it's slightly more expensive than a SyQuest drive, it's fast and reliable, and the disks are competitively priced. **Jun 93**

★★ **Performance/040 (33MHz), Impulse Technology, 404/889-8294, $2399.** For disk-intensive tasks, this 68040 33MHz accelerator board tested slower than the native CPU and, in general, was slower than comparable accelerator boards. It is compatible with all Mac II's. **Oct 92**

★★★ **PLI MiniArray 850MB, PLI MiniArray 2GB, Peripheral Land, 510/657-2211, $4999, $6999.** These RAID storage systems contain multiple drives that work as a single unit; they're an excellent option for image processing or for importing and exporting large files, but the price per megabyte is high. **Jan 93**

★★★★ **Quantum Passport XL 240, Quantum Corp., 800/624-5545, external chassis $469, 240MB drive $979.** An excellent piece of engineering, this fast, trouble-free, removable hard drive solves the problem of how to transport data from one computer to another. The price is only somewhat discouraging. **Oct 92**

★★★★ **Radius Rocket 33, Radius, 408/434-1010, $2499.** The accelerator board of choice for our reviewer, this 68040, 33MHz board is fast, reasonably priced, and compatible with a Mac II (with Rev. B ROM), IIx, IIcx, or IIci. **Oct 92**

★★★ **SmartStack, Envisio, 612/628-6288, SmartSource $199; SmartModules $549 to $2899.** The SmartStack line of modular storage peripherals may be neatly stacked on top of a common power supply to reduce desktop clutter and cabling problems. It's an expensive but slick storage solution. **Sep 93**

★★★ **TokaMac II FX 33, Fusion Data Systems, 512/338-5326, $2595.** CPU and FPU tasks on a Mac IIfx are faster than on a Quadra 950 with this 68040 33MHz accelerator board, but video- and disk-intensive tasks are still slower. It may be worth the cost if your IIfx already has a fast video board and more than enough memory. **Oct 92**

VIDEO/DISPLAY

★★★ **BookView Imperial, Computer Care, 612/371-0061, $1399 (includes 6MB of RAM).** This notebook-display adapter supports all common sizes of monitors, including 16-inch and 19-inch, plus both Mac and VGA. It is expensive, however, and uses 2MB of system memory for video processing. **Feb 93**

★★★ **Dycam Model 3, Dycam, 818/998-8008, $895.** Low-end, digital still camera is easy to use, and is a solid product if Instamatic-grade gray-scale meets your image-quality requirements. **Sep 93**

★★★ **L-TV, Lapis Technologies, 510/748-1600, $349.** Interface board allows a Mac LC, LC II, or Performa to use a standard television monitor as a display device. Unfortunately, a standard TV is a poor substitute for a color monitor, so while the L-TV does its job adequately, the setup is unsuitable for many applications. **May 93**

★★★ **Lightning Effects II, Spectral Innovations, 408/955-0366, $1295.** Digital-signal-processor chips dramatically speed up some Photoshop operations with this expensive Photoshop-acceleration board. It had problems acquiring some JPEG files. **May 93**

★★★★ **Macintosh 16" Color Display, Apple Computer, 408/996-1010, $1459.** The display quality of Apple's 16-inch monitor is tough to beat. It has realistic color, minimal curvature, and a uniform display. **Jun 92**

★★★ **Power Portrait, Sigma Designs, 510/770-0100, $899 or $949.** Hook your Classic or PowerBook to this 15-inch portrait-style monochrome display. Built-in QuickDraw acceleration speeds up the slow SCSI connection on the one hand and results in a few software incompatibilities on the other. **Feb 93**

★★★★ **PowerVision, Mirror Technologies, 612/633-4450, $499 to $999.** Separate VRAM means you don't lose system memory with this nicely priced notebook display adapter. It only supports 12-inch and 14-inch monitors, and 15-inch portrait gray-scale and black-and-white monitors. **Feb 93**

★★★★ **ThunderStorm, SuperMac Technology, 408/245-2202, $699.** Photoshop-acceleration board uses digital-signal-processor chips to speed up some Photoshop operations. It's fast, with good JPEG compatibility and a great manual. **May 93**

★★★★ **VideoSpigot, SuperMac Technology, 408/245-2202, $449 to $1299.** Grab video from a camcorder, video deck, TV, or monitor with this easy-to-install board and save it as a 24-bit QuickTime movie. Comes with ScreenPlay, an application that lets you choose from among several compression options, frame rates, and window sizes. **May 92**

★★★ **VideoToolkit 2.0.1, Abbate Video, 508/376-3712, $279.** Despite a few rough edges, this is an attractive, inexpensive solution for those who need to catalog and edit videotapes on a budget. **Sep 93** m

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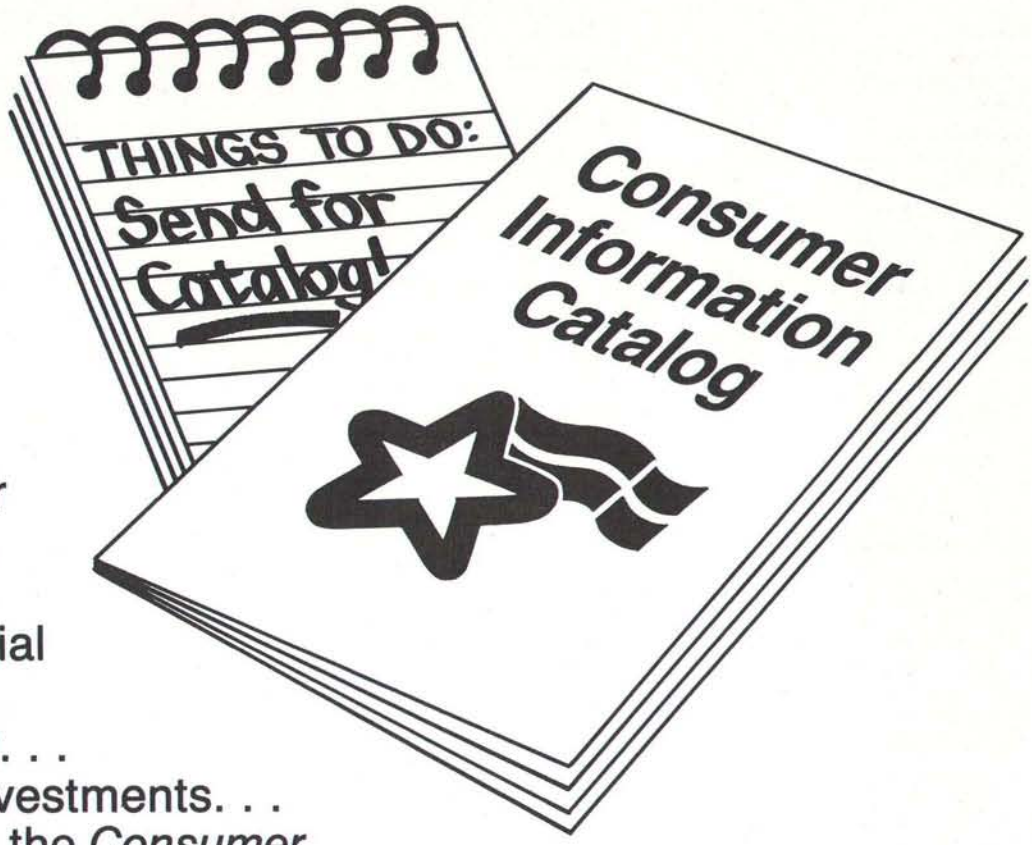

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BUNDLES

Aldus FreeHand 3.1.1 + addDepth 1.0.2 Aldus is bundling Ray Dream's $179 addDepth graphics utility (Aug 93 ★★★ review—"versatile, accommodating, and affordable") with its $595 FreeHand draw program (Jun 92 ★★★ review for version 3.1; 1993 World-Class award). Available through MacWarehouse (800/255-6227) for $389. *Offer expires 9/30/93.*

CADmover 3.4 + ViewPict 1.0 Kandu Software is including free its $29.95 ViewPict pan-and-zoom PICT viewer with its bidirectional, multiformat (15 in 2-D and 13 in 3-D) graphics-translation package (Aug 93 "Depth-Defying Design" feature—"an interpreter fluent in over a dozen formats"). Available direct (703/532-0213) for $495 ($346.50 for additional copies). *Offer expires 12/31/93.*

The Diet Balancer 1.0 + Meal Plan/Brand Name Foods Disks Nutridata Software is including $39.90 worth of free disks (six weeks of meal plans and 500 popular names) with its nutrition-analysis program (Dec 92 ★★★★ review—"easy-to-use personalized weight-planning tools"). Available direct (914/298-1308) for $69.95. *Offer expires 1/31/94.*

FileGuard 2.7 + Wiz Tools 1.1 ASD Software is bundling a $129 set of nine utilities (including backup and synchronization modules) for enhancing System 7 efficiency with FileGuard, its $249 password-protection security product (Feb 93 "Data Guardians" feature—"strong program"). Available through MacWarehouse (800/255-6227) for $189.95. *Offer expires 10/31/93.*

Mobius 19" B&W Display + Accelerator Mobius Technologies is bundling a $1300 Speedster 68040-based 33MHz IIsi or IIci accelerator with FPU with its $798 MD 202 Two Page Display and video-display board (May 93 "Here's Looking at Monochrome Monitors" feature, Editors' Choice). Available direct (800/800-4334) for $1598. *Exclusive* Macworld *offer expires 10/31/93.*

Point-of-Sale System Value-added reseller P.O.S. Direct (800/622-7670) is offering a $1458 point-of-sale system for $1216 that includes ShopKeeper, a $495 point-of-sale and inventory-management program; a $255 MMF electronic cash drawer; a $400 Citizen 3530 receipt printer; a $190 EZBarcode wedge reader; and a $99 EZBarcode steel wand reader. *Exclusive* Macworld *offer expires 12/31/93.*

ScanMaker II/IIxe Microtek Lab is offering a choice of one of the following software bundles with proof of a purchase made after 7/1/93 of either its ScanMaker II or IIxe flatbed scanner for approximately $950 (II) and for $1200 to $1300 (IIxe) through authorized resellers: Fractal Design's $399 Painter 2.0 color paint program (Jul 93 ★★★★ review—"will earn your admiration"); Calera Recognition Systems' $895 WordScan Plus 1.1 OCR program (Jun 92 ★★★ review for version 1.0—"offers some nice conveniences"); or Gryphon Software's $149 Morph 1.1 image-melding movie utility (Nov 92 ★★★ review for version 1.0—"using [it] is simplicity itself," "price is certainly right") plus HSC Software's $149 Kai's Power Tools 1.0 Photoshop plug-ins (May 93 ★★★★ review—"vastly expands Photoshop's capabilities"). *Offer expires 9/30/93.*

SyQuest Removable Cartridges + Macromedia ClipMedia SyQuest Technology is bundling Macromedia's $295 collection of multimedia clips with its 5¼-inch 44MB ($65) and 88MB ($110) removable cartridges. Available through national resellers. *Offer expires 9/30/93.*

COMPETITIVE UPGRADES

Deneba artWorks 1.0 Deneba Software is offering this $149 24-bit paint and draw program (Jun 93 ★★★ review—"enough low-end and midrange capabilities to make it one of the best graphics programs under $200") for $69 to owners of any paint or draw program. To locate your nearest participating reseller, call Deneba at 305/596-5644, ext. 131. *Offer expires 12/31/93.*

DiskExpress II 2.2 ALSoft is offering this $89.95 automatic disk optimizer to owners of MacTools, Norton Utilities, Public Utilities, or any other optimization software, for $19.95 (regularly about $45). Available direct (800/257-6381), or through MacConnection (800/800-3333) and MacWarehouse (800/255-6227). *Offer expires 12/31/93.*

DISCOUNTS/REBATES

Achieving Your Career 1.03 Up Software is offering this $69 job-search program (Aug 93 ★★★ review for version 1.02—"well-thought-out organizing tools") direct (800/959-8208) for $42. *Exclusive* Macworld *offer expires 11/15/93.*

FaxMania; Best of ClickArt Gold T/Maker is offering its $29.95 collection of electronic fax cover sheets direct (800/395-0195) for $9.95. It has also discounted its $24.95 Best of ClickArt Gold collection of 100 plus clip-art images to $9.95. *Exclusive* Macworld *offer expires 1/31/94.*

InTouch 2.0 Advanced Software is offering this $99.95 address book and reminder desk accessory (Feb 93 ★★★ review—"flexible output options"; 1993 World-Class award) direct (408/733-0745) for $35 (regularly $55 to $65). *Offer expires 12/31/93.*

Media-Pedia Video Clips Media-Pedia (617/235-5617) is offering a $100 discount on the regular price ($195 for VHS; $295 for S-VHS or Hi8; $395 for 3/4SP; $495 for BetaCamSP) of this 57-minute, royalty-free collection of over 150 full-screen, full-motion clips with sound (Apr 93 ★★★ review—"high-quality recordings," "a good value"). *Exclusive* Macworld *offer expires 9/30/93.*

nuBase Pro 1.8 Tactic Software is offering this $395 relational database (Sep 92 ★★★★ review for version 1.5—"approximates FileMaker's virtues in a relational database") direct (407/832-1400, 800/324-9855) for $225 (users of any competitive database can upgrade to nuBase Pro for $175), with the option of ordering the run-time version for $50 instead of $100. *Exclusive* Macworld *offer expires 11/15/93.*

Plots Unlimited 1.4 Ashleywilde is offering this $399 fiction-writing tool (Jul 92 ★★★ review—"easy to learn and use") direct (800/833-7568) for $299. *Exclusive* Macworld *offer expires 1/31/94.*

Stat-Ref 3.3 Teton Data Systems is offering a starter-pack subscription consisting of five titles from either of two $295 medical reference libraries (specify Primary Care or Cardiology) on CD-ROM (Jan 93 ★★★ review for version 3.2—"easy to use and relatively fast"), plus a $95 one-year software license, direct (800/755-7828), all for the price of $195. *Offer expires 11/31/94.*

Timeslips III 2.1 Timeslips Corporation is offering a $50 rebate (rebate coupon provided by reseller) on the $199.95 selling price of this $299.95 time-billing utility (Sep 92 ★★★★ review—"outstanding program for tracking time and expenses, calculating complex billing amounts, and creating reports and invoices") when purchased through Egghead Software (800/344-4323). *Offer expires 12/31/93.*

Transparent Language 2.0 Transparent Language is offering this $139 Spanish, German, French, Italian, and Latin language priority pack (Oct 92 ★★★★ review for version 1.04—"a superb tool for bolstering language skills") direct (603/465-2230) for $99 (includes three stories in language of choice, plus one in each additional language). *Exclusive* Macworld *offer expires 11/30/93.*

UltraPaint 1.05 Deneba Software is offering this $79.95 paint and draw program (Sep 93 "Fine Lines" feature, Editors' Choice) for $29.95. To locate your nearest participating reseller, call Deneba at 305/596-5644, ext. 131. *Offer expires 12/31/93.*

Wallpaper 1.5 Thought I Could is offering this $60 desktop designer (May 92 ★★★★ review for version 1.0.1—"creative in concept, realization, and purpose"), or its Zebra Edition for monochrome monitors, direct (212/673-9724) for $35. *Exclusive* Macworld *offer expires 12/31/93.* m

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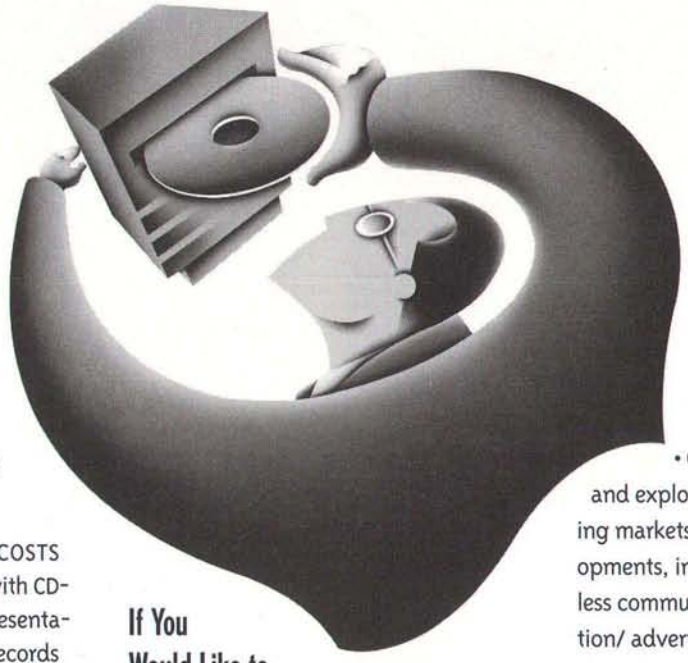

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Macworld Product Index

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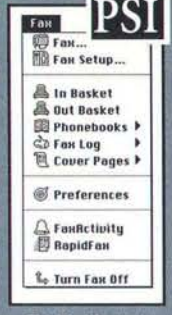

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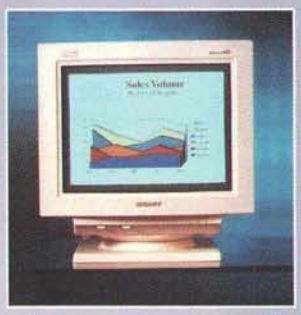

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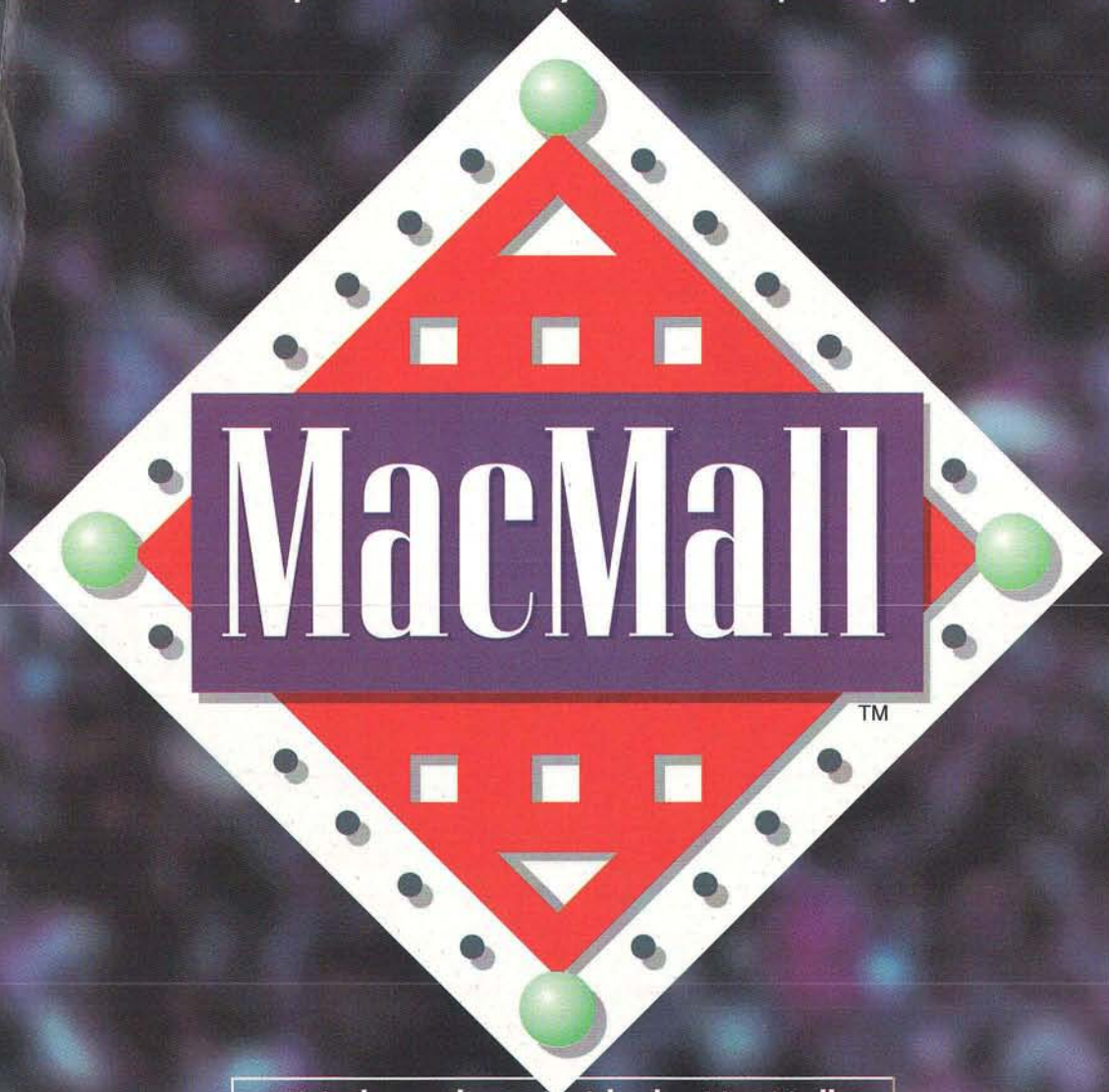

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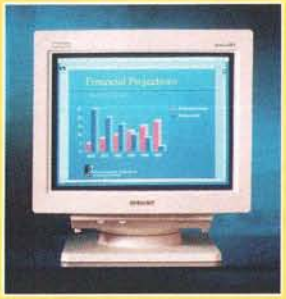

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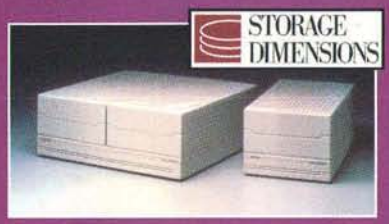

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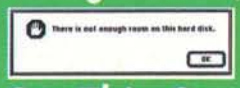

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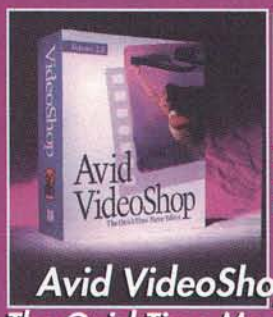

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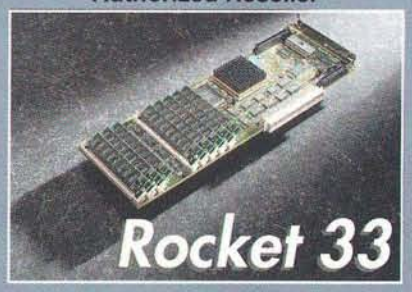

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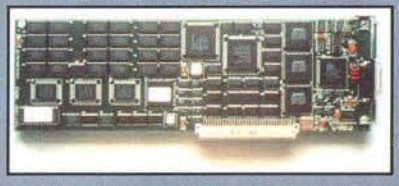

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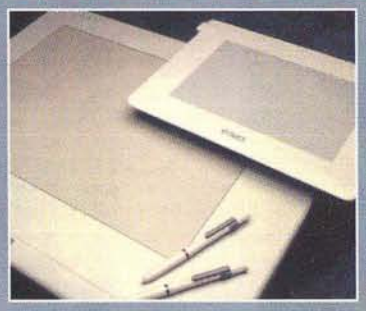

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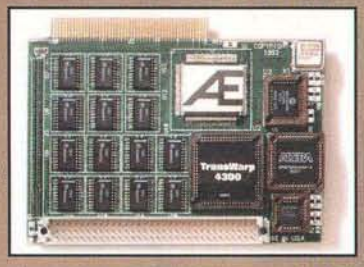

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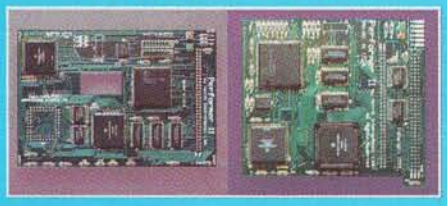

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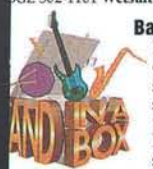

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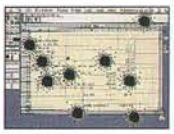

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During your lessons, you can click to "go to" the Arcade for some fun-and-games practice sessions, like the shooting range that knocks off ducks when you hit the right notes. You'll learn to play chords as parachutists jump out of a plane and learn melodies by repeating back what the Miracle plays. It's so much fun that you'll actually forget you're learning.

Or "go to" the Studio to record your own songs on an 8-track recorder (or play along with a symphony orchestra). The Studio provides over 120 instruments to choose from.

The Practice Room gives you a place to sharpen your skills or rehearse a particular tune until it's perfect, and the Performance Hall puts you on the stage for a formal concert.

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With the MIDI connection, you can transform your Mac into a professional recording, editing and playback studio with more power than the finest tape deck ever made. MIDI turns an average musician into a one-man orchestra. And MIDI on the Mac is so easy and flexible, it's finding a home in presentations, training, tutorials and anywhere the added value of wondrous sound enhances the situation.

One of the most intriguing aspects of MIDI is that a MIDI song file has multiple channels – where each channel is a different instrument. Channel 1 can be a piano, Channel 2 is the drums. Channel 3 might be a guitar, and Channel 4 the bass. Since each instrument is separate, you can remove an instrument at will – perhaps to sit in and jam with your own instrument! Or you can sit down at the keyboards and record channel by channel – adding them all up at the end for simultaneous playback. With MIDI, you can create your own fully orchestrated compositions!

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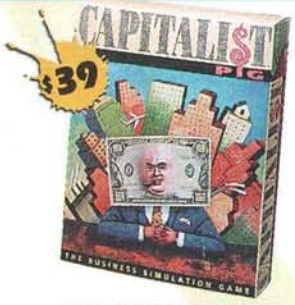
epsiTalk 2.0 opens your HyperCard stacks to multiple users on your network with non-dedicated read-and-write access. As a true peer to peer network solution, epsiTalk rounds its feature set with E-Mail, Instant Messages, Meetings, and file transfer. All the right tools to get you working together in the office or on the road with AppleTalk Remote Access. Item # EPSI10-80 (5-user license pak)

G-NETIX

The Entertainment Game of a Lifetime!

Just think...mankind has been wiped out overnight by a deadly plague. Orbiting in a space laboratory, you are suddenly the last living human being on or off the earth. Your task is to genetically re-create mankind. You have all the tools at your disposal but be careful, mutations can occur! Can you save mankind...the future of the world is depending upon you. Stimulating, entertaining and educational. Item # ISM14

Presenting Now Item # ISM15 **$63**
Surgeon 3 Item # ISM10 **$39**



CAPITALIST PIG

Animated business simulation game challenges you to build and run your own business under authentic economic conditions. Experience the challenge of business, scandals, fires, and terrorists, as you battle for billions or bankruptcy. Make crucial business decisions, enjoy the results or suffer the conse-quences. Packed with fun and rave reviews from entrepreneurs of all ages. Item # PLU10

Cause 2.1 - Personal Programmer **$182**
Item # PLU11

TAMARACK COLOR SCANNERS

Will Change the Way You Do Business

The 12000C is high resolution image capturing (1200 DPI) — the latest requirement in high technology desktop publishing. All models have exceptional color accuracy combined with outstanding speed and reliability. Optional transparency adapter gives you added versatility of scanning transparent documents to a fill 8.5" x 11.75". Item # TAM10

6000C (600 dpi) Item TAM12 **$1028**
8000C (800 dpi) Item TAM11 **$1198**

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NEW!

MacP&L

Breeze through all your accounting tasks. Enter information once and MacP&L updates the various accounts automatically. MacP&L has all the tools a small business requires: general ledger, accounts receivable and payable, inventory management, payroll, check writing, invoicing, and more. With over 100 reports in the program, you have access to more than just accounting data – you've got sales, inventory, payroll, and other analyses at your fingertips. With the multi-user version, everyone in your office can use MacP&L at the same time. Even advanced features like project expense tracking and multiple checking accounts are available to those who need them.

Minimum Requirements: Mac Plus, 1MB RAM, System 6.0.4.

START ACCOUNTING

6719 MacP&L

6720 MacP&L Multiuser ..... $368.

$99.

NEW!

SuperPaint 3.5

Aldus gives you fantastic graphics tools at affordable prices. Aldus SuperPaint 3.5 combines the best of paint and draw packages into one program. The result is the most versatile graphics toolkit available. SuperPaint has won 15 major awards in the last six years because it provides more "graphics horsepower" for the money. You can create anything from the simplest business illustrations to sophisticated full-color art. SuperPaint 3.5's new features include Crop Mark, Magic Marker, templates, and pressure sensitive tools. SuperPaint now supports 1- through 32-bit color, full-color TIFF and EPS, and includes textures, gradients, AutoTrace, Bezier Editing, Masking, Color Balancing, Brightness & Contrast, and much more.

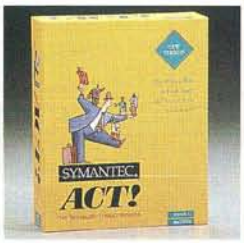
Minimum requirements: Mac SE, 2MB RAM, System 6.0.5, a hard drive.

Aldus Consumer Division

6493 SuperPaint 3.5 ○

$149.

NEW!



ACT! for Macintosh 1.1

Go for greater success with ACT!. It's the best-selling contact manager and features an easy-to-use contact database, powerful activity scheduler, sophisticated report generator, and full-featured word processor. ACT! provides tremendous productivity benefits for anyone whose business activity centers on people and schedules. It keeps you in touch with your contacts with its autodialer and one-click mail merge. And you'll stay on top of your schedule with ACT!'s calendar reminders. You'll always know where to be and when to be there. With ACT!, you'll be able to manage even more contacts more efficiently. It's the proven way to find, keep and satisfy your customers.

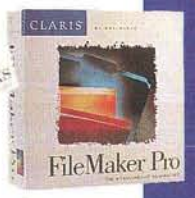
Minimum requirements: Mac Plus, 2MB RAM with System 6.0.4, 3MB RAM under System 7.

Symantec Corporation

6491 ACT! 1.1 for Macintosh ○

From $78.

POWERBOOK RECOMMENDED



Claris Upgrades

ClarisWorks offers you a single application where you can seamlessly combine text, graphics, spreadsheets, and charts all within the same page on the same screen. "If you already own ClarisWorks 1.0, the upgrade is well worth the price. If you're a new Mac owner, ClarisWorks is likely to be the only software you'll need for a long time to come." *MacUser*, Aug. '93.

FileMaker Pro gives you unrivaled power to manage, present, and share your information. Get started quickly with existing templates for invoicing, mailing lists, contact management, and more. Automate routine tasks, menu operations, and procedures with unique point-and-click script creation. An award-winning program!

Minimum requirements: ClarisWorks – Mac Plus, 2MB RAM, System 6.0.4.
FileMaker Pro – Mac Plus, 1MB RAM, System 6.0, 2MB RAM under System 7.

Claris

6276 ClarisWorks Upgrade ..... $78.

5556 FileMaker Pro Upgrade ..... $88.

MacUser Magazine

$36.

NEW!

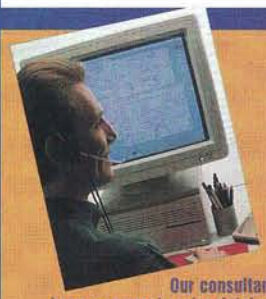
Seize the Day: The Illustrated Personal Organizer

This address book, screen saver, daily planner, and personal daily journal meets your minimum daily requirements of information, entertainment, and wisdom. Discover the rich historical legacy of each day from the perspectives of different subjects, beliefs, and customs with the "This Day" option. And this day book is totally customizable. Low-cost "plug-ins" let you add daily journal exercises for dreaming, writing, self-improvement, and more. Or add "This Day" perspectives like literature and business. Adjacent to your calendar are the incredible "Living Worlds" artwork created by Mark Ferrari. These spectacular full-color images change constantly, 24-hours a day, sunrise to sunset, season after season. Let it help you escape from your day.

Minimum Requirements: Mac SE/30, 4MB RAM, System 6.0.7, a hard drive.

6764 Seize The Day: The Illustrated Personal Organizer for Mac ○

6771 Seize The Day: The Illustrated Personal Organizer for Windows .....$36.



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DuoMate 8

POWERBOOK RECOMMENDED

Turn your Duo into a high-performance desktop computer with the DuoMate 8 docking station. It connects directly to the Duo's rear-panel connector using PowerLatch technology. And it outperforms other Duo adapters on the market by using a 32-bit bus to deliver the fastest video performance. The DuoMate 8 has a full range of ports for a floppy drive controller, ADB, and power. Use the sound output port for external speakers. Your Duo's serial and modem ports remain fully accessible. And it supports multiple monitor resolutions and sizes ranging from 12" to 21" with 8-bit color. Or try the DuoMate 16sc. It adds a SCSI port and supports 16-bit color.

Minimum requirements: PowerBook Duo.

RasterOps

6843 DuoMate 8
6844 DuoMate 16sc ..... $548.

NEW!

$63.

NEW!

PowerBook Duo Battery

Absolute Batteries offer you the most affordable PowerBook power. They have internal protection against short circuiting and gold terminals for optimal contact. These are the finest quality cells available and have a full one-year protection warranty. Each has a two-hour average life before recharging is necessary. A Battery Conditioner for recharging is also available or get the 2400mAh Battery and Conditioner in the Combo Pack for only $101.

Absolute

6684 PB Duo Battery
6682 PB Battery (140-180) 2400mAh ..... $49.
6683 PB Battery (140-180) 2800mAh ..... $55.
6685 PB Battery Conditioner (140-180) ..... $68.
6686 Battery Combo Pack ..... $101.

$288.

GET FAXMANIA AND WORLDLINK FREE!

SupraFAXModem V.32bis MacPac

"The SupraFAXModem V.32bis is an excellent value," raves Tom Negrino of *Macworld*. It features 14,400 bps data and fax communications with up to 57,600 bps throughput using V.42bis data compression. The modem automatically negotiates the fastest connection, and sending a fax is as easy as printing. You can even delay transmission until times when long-distance rates are lower. The Silent Answer feature detects if an incoming call is fax or voice, and handles it appropriately. The MacPac includes cables, FaxMania, and WorldLink, FREE. FaxMania is a collection of fun cover sheets, and WorldLink lets you connect to the Internet.

Supra Corporation

4017 SupraFAXModem V.32bis MacPac O
5575 SupraFAXModem 144 PB O ..... $298.
6651 SupraFAXModem 144 LC O ..... $258.

Supra Corporation

$79.

NEW!

PowerMerge 2.0

If you use multiple Macs, PowerMerge makes sure you're working on the latest version of your files. It finds which files were modified and updates them on the other Macs. It also tracks deleted, renamed, and relocated files and makes the corresponding changes on the other Macs. PowerMerge saves you disk space by locating duplicate files, and makes online backup easy.

Minimum requirements: Mac Plus, 1MB RAM, System 6.0.4, 2MB RAM under System 7.

Leader Technologies

6814 PowerMerge 2.0 O

From $48.

Sony storage media

Sony's Double-Sided, High-Density 3.5" Floppy Disks feature full lifetime warranties and an exclusive magnetic particle formulation for unsurpassed performance. When you use a **Sony 3.5" Rewritable Optical Disk**, you get superior performance and reliability because the disks are precisely tuned to perform across all 1800-3600 rpm ISO standard drives.

Sony

3331 High-Density Bulk 50 Pack O..... $49.
4478 3.5" MO Rewritable 128MB O..... $48.

$769.

Bernoulli MacTransportable Multidisk 150

Enjoy all the benefits of a Bernoulli with the flexibility to read and write to disks of many capacities – 35MB, 65MB, 105MB, and 150MB. And the Multidisk 150 is downward compatible so it reads and writes to 90MB disks and reads 44MB disks. You get unlimited storage expandability, lock-away security, and transportability. The patented Bernoulli design resists head crashes and the sturdy disks can survive a drop of eight feet! This Bernoulli is internally terminated with a single external SCSI connector, so it must be installed as the last device on your SCSI chain.

IOMEGA

5609 Bernoulli MacTransportable Multidisk 150 O

$598.

MS 200 CD-ROM Drive

This multi-session drive provides blazing 200ms access time and delivers sustained data transfer rates of 330K per second. It reads data at two different speeds – one for audio and another for data. This dual-speed capability allows for greater performance reading CD-ROMs, while maintaining compatibility with audio CDs. The MS 200 has a 256K buffer for great performance. It supports ISO 9660, High Sierra, Apple Photo Access, Kodak PhotoCD, HFS, and Audio CD formats. And it includes PlayCD HyperCard-based software for playing audio CDs from the desktop. This drive comes in a sturdy metal chassis and is supported by a one-year warranty.

PLI

5729 CD-ROM MS 200 (Toshiba Mechanism)

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Microsoft Office

A complete software solution for your office! Microsoft Office includes the latest versions of Microsoft Word, Excel, PowerPoint, and Mail for over $1,000 less than if you purchased them separately. These programs were designed to work together, so you can swap data and graphics between them with ease. And once you're familiar with one program, you're well on your way to knowing them all.

Minimum requirements: Mac Plus, 2MB RAM, System 6.0.5.

Microsoft

5645 Microsoft Office 3.0 ○

Microsoft

$30.

Capitalist Pig

Build and run your own business under authentic economic conditions in this exciting simulation. Experience the challenge of business, scandals, fires, terrorists, and more as you battle for billions or bankruptcy. Packed with sound, animation, and fun, Capitalist Pig is a must-have game. You never knew business could be so much fun!

Minimum requirements: Mac Plus, 1MB RAM System 6.0.

Pluma

4640 Capitalist Pig

MAC'S PLACE EXCLUSIVE BUNDLE

$49.

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$90. if purchased seperately

Kaboom! 2.0/More Kaboom and Chameleon Bundle

Give your Mac more personality with an exclusive bundle at an unbeatable price. **Kaboom! 2.0** gives you 150 wacky sounds, from roosters crowing to tires screeching. Each one can be played when you start up your Mac, insert a disk, empty the trash, and more! You also get the new Kaboom! Factory sound editor. With **More Kaboom!** you get 100 more sounds, including dialogue from classic TV shows like *I Dream of Jeannie, Mr. Ed, Dragnet,* and *Bewitched*! And decorate your desktop with **Chameleon**, the ultimate desktop pattern utility. You get the finest patterns available and a full-featured editor. With this bundle, your Mac will never be dull.

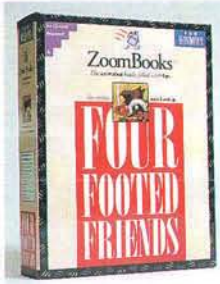
Minimum requirements: Any color Mac, 2MB RAM, System 7, a hard drive.

Nova/Logical Solutions

6445/5927 Kaboom! 2.0/More Kaboom and Chameleon Bundle

$36.

NEW! CD-ROM PRODUCT



Four Footed Friends

Four Footed Friends is an interactive storybook and more. This wonderful collection of colorful illustrations and rhymes is hosted by talking bookworm characters. The bookworms introduce children to the animals and guide them through this entertaining, classic tale. Kids explore just by pointing and clicking. Wendy the Word Worm teaches reading skills. Albert the Fact Worm teaches important facts and figures. And Pablo the Picture Worm helps children learn about colors and shapes while they create artistic effects. The highest quality animation, video, sound effects, original music, and humor will draw your children to this CD-ROM again and again. For ages 3 and up.

Minimum requirements: LC, 4MB RAM, System 6.0.7, CD-ROM drive, 256-color monitor.

T/Maker

6817 Four Footed Friends Mac CD-ROM

6818 Four Footed Friends Windows 3.5" diskette ..... $36.

T/Maker

$44.

MacFLY

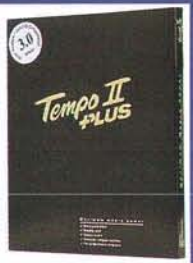
Get fast-reaction control and the ultimate in realism for flight simulators and your favorite Macintosh games with the MacFLY Joystick. Customize the settings to your tastes with the included software. Two independent fire buttons with two modes provide double the functions. Your mouse stays active when you use the MacFLY; just move either device to automatically switch control.

Minimum requirements: Mac SE, 1MB RAM, System 6.0.4.

IZU Products

6458 MacFLY ○

$99.



Tempo II Plus 3.0

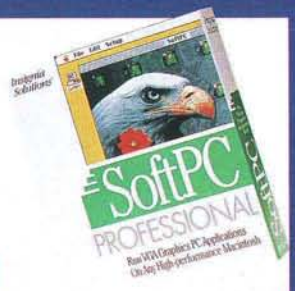
Automate your Mac with "intelligent" macros. Create hundreds of time-saving shortcuts, and simplify complex tasks. Tempo's "interactive" macros use conditional tests to determine how to format a document, when to back up your database, or which filters to apply in a "batch-process" task. Free phone dialer included!

Minimum requirements: Mac Plus, 1MB, System 6.0.2.

Affinity Microsystems Ltd.

6534 Tempo II Plus 3.0 ○

$185.



SoftPC Professional

Do the PC one better by bringing PC applications to your Mac! There's no need to add hardware. With SoftPC, software does it all. SoftPC Professional 3.0 emulates VGA graphics giving you 256 colors and increased monitor resolutions to show crisp, realistic, and vibrant graphics. It emulates an 80286 processor and an Intel 80287 math coprocessor. Run protected-mode MS-DOS applications which have been written to utilize extended memory. MS-DOS 5.0 is pre-installed. And Microsoft CD-ROM extensions are also included, which means you can run PC CD-ROMs with your Mac CD-ROM drive. Plus, you can easily copy and paste text and graphics between PC and Mac applications.

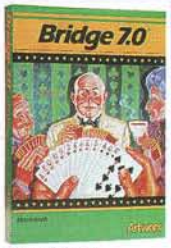
Minimum requirements: SE/30, 8MB RAM, System 6.0, 6MB hard drive space.

Insignia Solutions

5925 SoftPC Professional

Insignia Solutions

$28.



Bridge 7.0

Bridge 7.0 is a complete bridge-playing program. You and your computer partner bid against two computer opponents and then play out the hand. Bidding is Standard American, five-card major and utilizes the Stayman and Blackwood conventions as well as weak or strong 2 bids. Many new features have been added to further refine this classic computer program.

Minimum requirements: Any Mac with 1MB RAM and an 800K drive.

Artworx

6545 Bridge 7.0

6543 Kaleidokubes ..... $12.

$48.

CD-ROM ToolKit

This utility replaces your CD-ROM drive's original software, transparently speeding up CD-ROM operations up to 1000 percent, improving compatibility, and allowing you to play audio CDs. There are no boards, cables, or cards to install. The CD-ROM ToolKit transparently caches CD-ROM information to your hard disk so mounting, folder opening, seeks, and searches happen instantly.

Minimum requirements: Mac Plus, 1MB RAM, System 6.0.4, CD-ROM drive.

FWB

5731 CD-ROM ToolKit

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NEW!

QuickFLIX

QuickFLIX is the first inexpensive movie-making tool for Mac users. It makes the production of QuickTime movies more affordable. And it's got the power to build QuickTime movies for business presentations, educational uses, CD-ROMs, or just for fun. QuickFLIX is the personal movie making software for all Mac users. It's got all the software tools you need to produce your own movies including digitizing, editing, basic special effects, sound editing, titling, layering, and motion control. All in a familiar Macintosh interface. Don't doom another vacation's memories to a dusty collection of unedited VHS tapes. Get QuickFLIX.

Minimum requirements: Mac II, 3MB RAM, System 7, a hard disk.

VideoFusion

6784 QuickFLIX

VIDEOFUSION

$184.

DeBabelizer

This graphics processing toolbox will save you time, effort, and money. It translates from and to over 50 bit-mapped graphic file and animation formats for Mac, DOS, Windows, Silicon Graphics, Sun Microsystems, Amiga, and others. You can even edit images without the creating software. Batch processing and internal scripting functions save time by automating repetitive manipulation and editing tasks. Create QuickTime blue-screen effects with background removal features. DeBabelizer will also report and display differences between original and revised images. Jack Eastman, VP Engineering of Berkeley Systems (makers of After Dark) says, "DeBabelizer has the best cross platform graphics translation for serious graphics production. We couldn't produce our graphics without it."

Minimum requirements: Mac Plus, 2MB RAM, System 6.0.7.

Equilibrium

6193 DeBabelizer

DE·BABELIZER THE GRAPHICS PROCESSING TOOLBOX

$178.

FontChameleon

Get a library of over 200 popular text fonts and the ability to create literally millions of new ones. FontChameleon's revolutionary technology allows you to alter the preset designs by "blending" two fonts for a new design. Each font's X-height, condense/extend, and boldness can be altered with easy-to-use slider controls. Create Postscript Type 1 or TrueType fonts.

Minimum Requirements: Mac Plus, 2MB RAM, System 6.0.7, a hard disk.

Ares

6766 FontChameleon ○

$759.

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NEW!

Alias Sketch! with Adobe Photoshop 2.5 or Adobe Illustrator 5.0

Imagine, a tool that "... extends your innate 2D drawing prowess into the third dimension almost without your knowing it" – Don Crabb, *Byte Magazine*. Alias Sketch! is a breakthrough product for illustrators, graphic designers, and other creative professionals. It lets you import 2D artwork from programs such as Illustrator, FreeHand, and Photoshop, and produce stunning 3D illustrations. Or draw freeform curves and shapes in 3D space using 2D techniques. Sketch! features perspective matching, lighting, photo-quality rendering, and more, and exports in PICT, TIFF, EPSF, and others. Buy now and get this August '93 *Macworld* Editors Choice Award product with your choice of Adobe Photoshop or Adobe Illustrator, absolutely FREE.

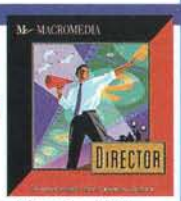
Minimum Requirements: Mac IIx, 8MB RAM, System 6.0.5, a hard drive.

Alias Research

6794 Alias Sketch! with Adobe Photoshop 2.5
6795 Alias Sketch! with Illustrator 5.0

Sketch!

$575.



NEW!

Macromedia Director 3.1

Competitive Upgrade

This award-winning multimedia application gives you the power to create engaging, interactive presentations complete with sound and QuickTime movies. Easily combine text, graphics, animation, sound, and video to create professional corporate presentations, information kiosks, and self-guided training programs. Owners of Supercard or Asymetrix Toolbox qualify for the competitive upgrade.

Minimum Requirements: Mac Plus, hard drive, System 6.0.7., 2MB RAM for B&W, 4MB RAM for color.

Macromedia

6722 Macromedia Director Comp. Upgrade
4354 Macromedia Director 3.1 ..... $798.

How to Order

- Call 1-800-270-0009 anywhere in the USA or Canada. Call 206-883-8312 for international orders.
- Fax your order to 1-800-881-3090. International fax orders: 206-881-3090.
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- Mac's Place is open from 6 a.m. to 10 p.m. M-F Pacific Time, and 6 a.m. to 6 p.m. on Sat. and Sun.
- No sales tax (except WA residents add 8.2%, IL residents add 6.25%, to total, including shipping).
- VISA, MasterCard, Discover Card, American Express, OPTIMA, checks, and P.O.s gladly accepted. Your credit card is never charged until your product ships.
- All in-stock items ship same day, (barring system failure, etc.) to your doorstep, for just $3 (USA) via overnight service. Rural locations may require an additional day for delivery.
- Our $3 shipping charge includes insurance at no extra charge.
- When a partial order is shipped, we pay freight on additional shipments.
- Many products carry a money back gurarantee (MBG).

VISA MasterCard DISCOVER

- Defective software is replaced immediately with like items. Defective hardware items repaired or replaced at our discretion.
- We reserve the right to revoke money back guarantee privileges.

International Orders

- Call 206-883-8312 for our international sales line.
- Fax your order to 206-881-3090 for international orders.
- We ship throughout the free world.
- International orders will be charged full shipping rates plus insurance.

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Redmond, WA 98052

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$1798.

Tamarack ArtiScan 12000C w/Photoshop 2.5

Scan art with remarkable accuracy. Tamarack ArtiScan gives you state-of-the-art resolution and impeccable color image quality. Art and technology unite in 1200 x 1200 dpi high-resolution, so your pictures, photos, and graphics are reproduced on-screen with spectacular accuracy. Photoshop 2.5 is included and a transparency option is available. Adobe Photoshop 2.5 is the world's leading photo design and production tool. Design and produce color and black-and-white images, right at your desk. Start from scratch or with any scanned image. Add or correct color, execute delicate retouching, import illustration files, create duotones, tritones, quadtones, and more. Then produce it with professional controls for four-color-process proofing and separations.

Minimum requirements: Mac SE, 2MB RAM, System 6.0.4, hard disk.

Tamarack Technologies

6536 ArtiScan 12000C w/Photoshop 2.5

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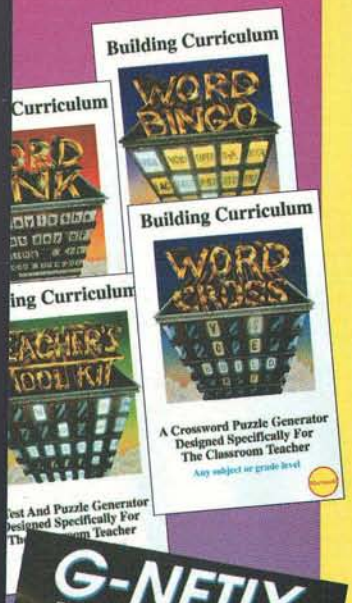

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Teacher's Toolkit $62.95

Kid Works 2
$33.95 MAC
School Version $59.95
Hard disk required.

G-Netix
$37.95 MAC
(Retail $69.95)

The Adventures of Pinocchio
$49.95 MAC
School Version $52.95
CD-ROM Version $52.95

Surgeon 3 – The Brain
$27.95 MAC
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Apple LaserWriter 300 / 310	$765 / $950
Apple LaserWriter Pro 600	$1849
Apple LaserWriter Pro 630	$2375
Dataproducts LZR 960 / 1560	$1049 / $2799
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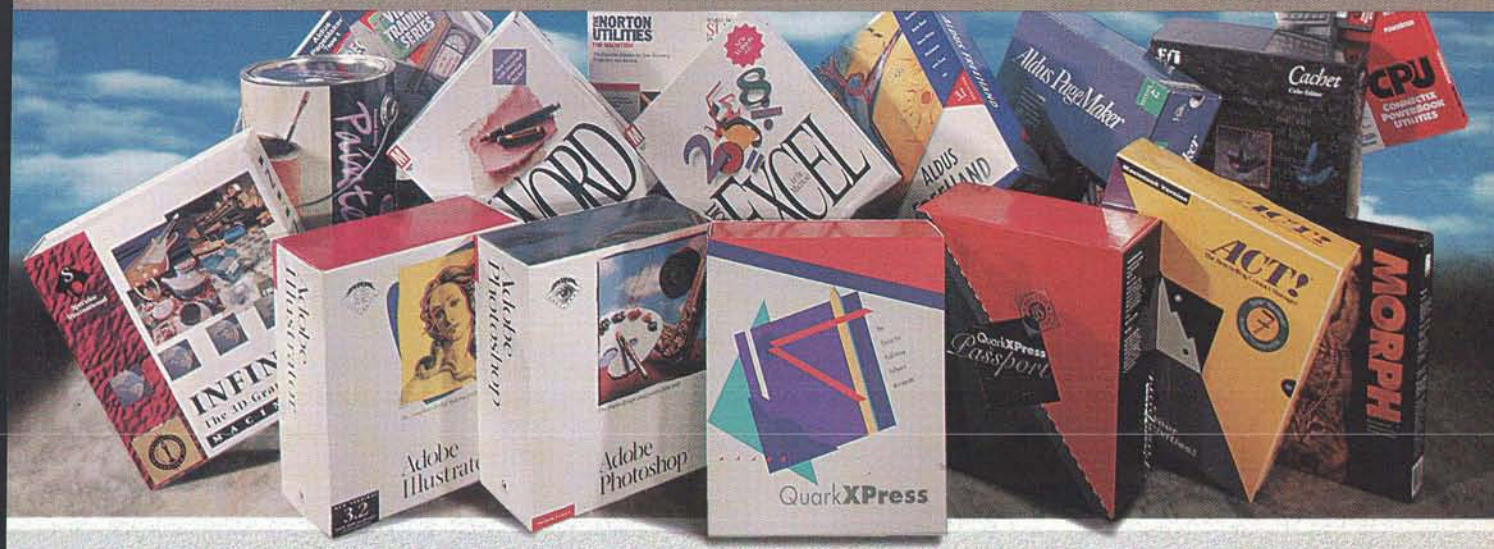

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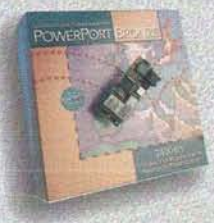

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33 MHZ Powercache	$358	$458
40 MHZ Powercache	$534	$634
50 MHZ Powercache	$688	$788
Powercache Adapter		$99
Fast Cache Quadra 700, 900		$249
Fast Cache Quadra (all)		$375
33 MHZ Turbo 040		$1345
Fast Cache Turbo 33-128k		$179
40 MHZ Turbo 040		$2249

SyQuest

Unformatted Capacity Includes one free cartridge	Access Time (2 year Warranty)	Price
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88C mb External	19 ms	$508 SALE
105 mb External	14.5 ms	$648

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Note: Bundles are only for sale with purchase of an Airbourne CD-ROM Drive

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- Publish It! 2.0 with Clip Art Fonts • Color it!

Modems

PROMETHEUS

All units come with MacFAX & MacKnowledge Software	Price
Ultima Home Office ext 14.4/14.4SR Fax w/ V.42 bis & voice	$378
Promodem 144i Internal for Powerbook 14.4/14.4SR Fax w/ V.42 & V.42 bis	$248
Promodem 144e ext 14.4/14.4 SR Fax w/ V.42 & V.42 bis	$248 SALE
Promodem 24e ext 24/96SR Fax w/ V.42 & V.42 bis	$128
Promodem Mini 2400 2400 BPS mini, data only	$79

ZOOM TELEPHONICS

All units come with Microphone LT & STF FAX Software	Price
Faxmodem PBK for Internal Powerbook 96/48 SR Fax w/2400 BPS Modem	$99
Faxmodem PKT Portable 96/48 SR Fax w/2400 BPS Modem	$109
Faxmodem FXV V42 bis/MNP5/2400 BPS, 96/96 SR Fax	$129
Faxmodem VFX V.32 V.32 bis, 14.4 data & fax, V.42 bis/MNP5	$258

Scanners

UMAX

All Scanners includes free software

Model	Price
UC630 - Color w/free Photoshop v2.5	$1078
UC1260s - Color w/free Photoshop v2.5	$1848 SALE
UC840 - Color w/free Photoshop v2.5	$1248
Transparency Unit	$698
Auto Document feeder	$398
UG630 - Greyscale w/free Typereader OCR, OFOTO & Publish It	$848

Optical & DAT Drives

Includes one free disc (1 year Warranty)		
128 mb Panasonic Optical	39 ms	$838
128 mb Epson Optical	29 ms	$948
128 mb Fujitsu Optical	34 ms	$998 SALE
256 mb Most Optical	31 ms	$1498

All DAT Drives Include free 90m Tapesoftware	W/Retrospect	W/Retrospect Remote
WangTek 2.1 Gig DAT	$998	$1198
WangDat 5.0 Gig DAT	$1298	$1498

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Model 1x8	70 NS Call	80 NS Call	Model 2x8	70 NS Call	80 NS Call
4x8	Call	Call	16x8	Call	Call

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4mb Call	8mb Call	16mb Call

Hard Drives

CONNER

Unformatted Capacity	Access Time	Internal	Extern
3.5" Disk Drives (2 year Warranty)			
85 mb LPS	17 ms	$178	$23
170 mb LPS	12 ms	$208	$26
212 mb LPS	9 ms	$288	$34
540 mb	8.5 ms	$728	$78

QUANTUM

ELS Series (3.5" Low Profile and Low Power Drives)			
85 mb	17 ms	$174	$22
127 mb	17 ms	$188	$23
170 mb	17 ms	$198	$24
LPS Series (3.5" Low Profile and Low Power Drives)			
240 mb	10 ms	$278	$338
525 mb	10 ms	$648	$69
Prodrive Series (3.5" Half Height Drives)			
1.0 Gig	10 ms	$948	$99
1.2 Gig	10 ms	$1098	$114
GO•Drive 2.5" Hard Drive (All Quantums - 2 year Warranty)			
160 mb	17 ms	$499	$59

TOSHIBA

3.5" & 2.5" Disk Drives (2 year Warranty)			
2.5" 213 mb	9 ms	$528	$62
3.5" 830 mb	12 ms	$1029	$108
3.5" 1.2 Gig	12 ms	$1298	$134

FUJITSU

3.5" & 5.25" Disk Drives (5 year Warranty, 3 year on 105mb)			
3.5" 105 mb	9 ms	$178	$22
3.5" 520 mb	9 ms	$698	$74
3.5" 1.1 Gig	8.5 ms	$1128	$118
5.25" 2.4 Gig	11.5 ms	$2198	$229

SEAGATE

3.5" Half Height Drives (1 and 5 year Warranties)			
1.2 Gig	10.5 ms	$998	$1048
2.4 Gig Baracuda		$2298	$2348
Wren and Elite Series (5.25" Full Height Drives)			
Wren 9 2.1 Gig	12.5 ms	$1528	$1628
Elite 1 1.6 Gig	11.5 ms	$1689	$1789
Elite 2 2.4 Gig	11 ms	$2098	$2198
Elite 3 3.4 Gig	11 ms	$2598	$2698

Media

Model	QTY 1	5PK	10PK	Model	QTY 1	5PK	10Pk
SyQ44 cart	$62	$60	$59	128mb OPT	$37	$35	$33
SyQ 88 cart	$95	$94	$93	256mb OPT	$79	$76	$73
SyQ 105 cart	$75	$74	$73	90mm DAT	$19	$17	$14

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Model	Description	Price
MICROTEK		
Microtek 600ZS	***24-bit Color, 600x300 dpi***	***$749***
Microtek ScanMaker II	24-bit Color, 600x300 dpi	$837
Microtek ScanMaker IIxe	24-bit Color, 600x300 dpi	$1,099
Microtek ADF	For 600/Scanmaker II	$489
Transparency Adapter	For Scanmaker II/IIxe	$CALL
UMAX		
UMAX UC630	24-bit Color, 600x300 dpi	$1,069
UMAX UC840	24-bit Color, 800x400 dpi	$1,199
UMAX UC1260	***24-bit Color, 1200x600 dpi***	***$1,839***
Transparency Adapter	For All Models	$679

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Hard Drives

FUJITSU

Capacity	Description	Internal	External
520MB	***3.5" HH 9ms***	***$675***	***$735***
1200MB	3.5" HH 9ms	$1,049	$1,099
2000MB	5.25" FH 14ms	$1,839	$1,939
2400MB	5.25" FH 11.5ms	$1,950	$2,050

Fujitsu Drives carry a 5 year warranty

Quantum

Capacity	Description	Internal	External
80MB	2.5" Notebook 17ms	$205	$305
120MB	2.5" Notebook 17ms	$269	$369
160MB	2.5" Notebook 17ms	$285	$385
42MB	3.5" LP 19ms	$128	$188
85MB	3.5" LP 17ms	$174	$234
127MB	3.5" LP 17ms	$189	$249
170MB	3.5" LP 17ms	$196	$258
240MB	3.5" LP 10ms	$275	$335
525MB	3.5" LP 10ms	$637	$697
700MB	3.5" HH 10ms	$775	$835
1000MB	3.5" HH 10ms	$937	$997
1200MB	***3.5" HH 10ms***	***$1,087***	***$1,157***

Go Drives carry a 1 year warranty / The rest carry a 2 year warranty

CONNER

Capacity	Description	Internal	External
85MB	3.5" LP 17ms	$177	$237
170MB	***3.5" LP 17ms***	***$197***	***$257***
212MB	3.5" LP 12ms	$287	$347
540MB	3.5" HH 8.5ms	$727	$787

Conner Drives carry a 1 year warranty

TOSHIBA

Capacity	Description	Internal	External
877MB	3.5" HH 12.5ms	$897	$957
1230MB	***3.5" HH 12.5ms***	***$997***	***$1,057***

Toshiba Drives carry a 3 year warranty

Seagate

Capacity	Description	Internal	External
1200MB	3.5" HH 10.5ms	$996	$1,056
1200MB	5.25" FH 15ms	$969	$1,069
1600MB	5.25" FH 15ms	$1,269	$1,369
2100MB	5.25" FH 12.9ms	$1,559	$1,659
2100MB	***3.5" HH 8ms***	***$2,299***	***$2,359***
1600MB	5.25" FH 11.5ms	$1,669	$1,769
2400MB	5.25" FH 11ms	$2,169	$2,269
3400MB	5.25" FH 11ms	$2,769	$2,869

Seagate Drives carry a 1 year warranty

Maxtor

Capacity	Description	Internal	External
120MB	3.5" LP 15ms	$194	$254
212MB	3.5" LP 15ms	$269	$329
345MB	3.5" HH 15ms	$449	$509
540MB	3.5" HH 8.5ms	$779	$839
1200MB	***3.5" HH 8.5ms***	***$1,279***	***$1,339***
1700MB	5.25" FH 13ms	$1,299	$1,399

Maxtor 3.5" Drives carry a 1 year warranty
5.25" Drives carry a 2 year warranty

MICROPOLIS

Capacity	Description	Internal	External
560MB	3.5" HH 10ms	$879	$939
1200MB	3.5" HH 10ms	$1,009	$1,069
2000MB	***3.5" HH 10ms***	***$1,889***	***$1,949***
2400MB	5.25" FH 11.5ms	$2,059	$2,119
3500MB	5.25" FH 11ms	$2,749	$2,849

Micropolis Drives carry a 5 year warranty
Includes Drive, Formatting SW, Cables, and Terminator.

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3.5" Optical Drives

Model	Capacity	Seek	MacKit
Panasonic-128	128mb	35ms	$837
Fujitsu-128	128mb	30ms	$989
Sony-P301	128mb	35ms	$1,269
Most-256	***128/256mb***	***37ms***	***$1,499***

Includes external drive, 25/50 SCSI Cable, Mac SW, and Terminator

Cartridges	
Sony 128mb as LOW as	$45
Komag 128mb as LOW as	$33

SALE

SyQuest Drives

Model	Internal	External
SyQuest 105	$499	$559
SyQuest 88C	$369	$429
SyQuest 88	$309	$369
SyQuest 44	***$239***	***$299***
Dual Drives		
SyQuest 88/44	N/A	$678
SyQuest 88/88	N/A	$709
SyQuest 44/44	***N/A***	***$569***
Cartridges		
105MB Cartridges (5+ or with drive Purchase)		***$59.99***
88MB Cartridges (5+ or with drive Purchase)		$89.99
44MB Cartridges (5+ or with drive Purchase)		$59.99

SALE

CD-ROM Drives

Kodak Compatible

Model	Description	MacKit
Texel	Multi Session/Dual Spin	$439
Toshiba 3301	Multi Session/Single Spin	$449
Toshiba 3401	Multi Session/Dual Spin	$489
Pioneer 600	6 Disc/Single Spin	$899
Pioneer 604	***6 Disc/Dual Spin***	***$1,199***
PM CDR	CD-ROM Recorder	$3,499

Includes external drive, 25/50 SCSI Cable, Mac SW, Caddy, and Terminator

SALE

5.25" Optical Drives

Model	Capacity	Seek	MacKit
Ricoh-9200EII	594/650mb	66ms	$1,799
Sony-E501	594/650mb	66ms	$1,949
Sony-E502	594/650mb	66ms	$2,049
Ricoh-9200EX	***594/650mb***	***35ms***	***$2,249***
MaxOptix-Tahiti II	594/650/1gb	25ms	$2,799
PMO-650	594/650mb	19*ms	$CALL
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Archive Python	2 Gbyte	3.5"HH	$984
Archive Turbo	2-8 Gbyte	3.5" HH	$1,249
HP 35470A	2Gbyte	3.5"HH	$1,189
HP 35480A	3-5Gbyte	3.5"HH	$1,309
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APS MX 245[2] Maxtor 7245 mechanism	279	349

Model	Internal	External
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APS MX 345[2] Maxtor 7345 mechanism	$459	$529
MW **APS F 520**[5] Fujitsu M2624S mechanism	759	829
APS Q 525[2] Quantum Lps525 mechanism	699	769
APS MX 540[2] Maxtor MXT540 mechanism	899	969

Model	Internal	External
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APS GRS 160[1]	449	399	529[†]
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600mb	3.5"	10.5ms	889	949*
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2.2gig	5.25"	12ms	1589	1689*
2.4gig	5.25"	11ms	1935	2035
2.5gig	3.5"	8ms	2229	2289
3.4gig	5.25"	10ms	2390	2490

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Capacity	Size	Access	Internal	External
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1.3 - 8gig	ArchiveTurbo	4mm	1169	1229
1.3 - 2gig	Exabyte 4200	4mm	899	959
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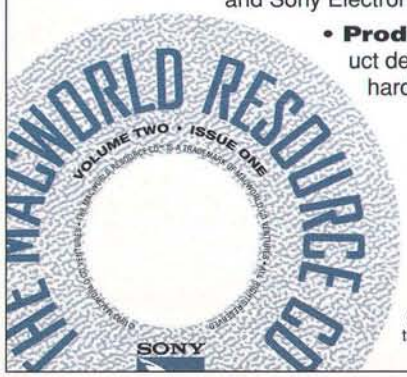

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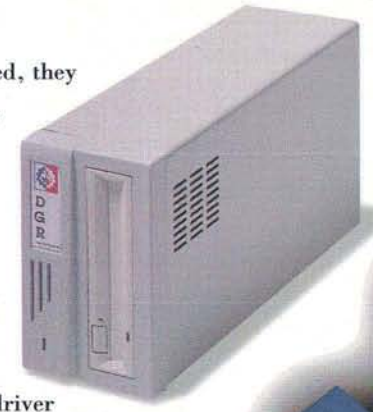

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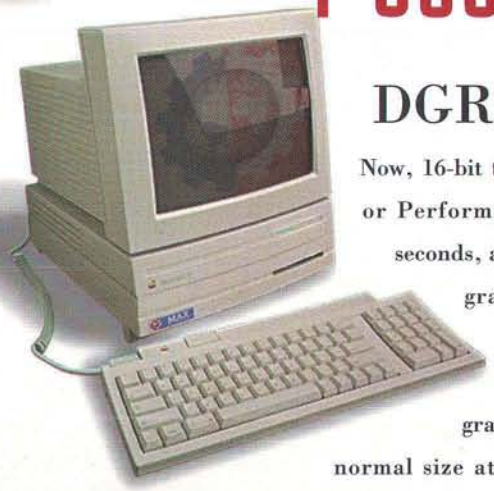

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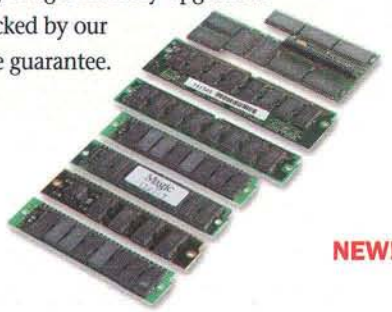

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CMO-OMD5010	Epson	128mb	3.5" Half Height	45ms	$959	$959
CMO-JY750	Sharp	594/652mb	5.25" Half Height	40ms	$1869	$1899
CMO-5031E	Ricoh	594/652mb	5.25" Full Height	28ms		$2249
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FUJITSU

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520mb	M2624FA	3.5" Half Height	9ms	496mb	$689	$74
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Seagate

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2.4GIG	ST12400N		9ms	2000mb	$1995	$2055
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2.4GIG	ST12550N	Barracuda 2	8ms	2050mb	$2269	$2329
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UTI0417

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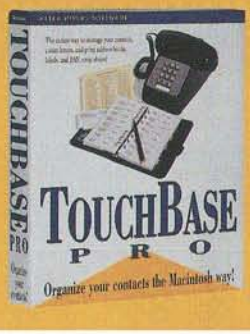

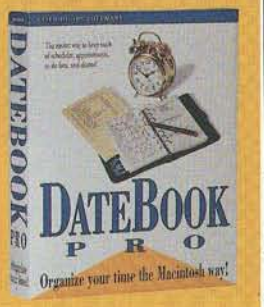

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UTI0312

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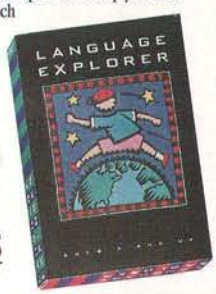
EDU0490



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Publisher: Berkeley Systems
UTI0415

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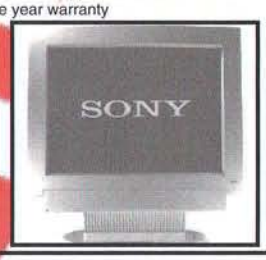

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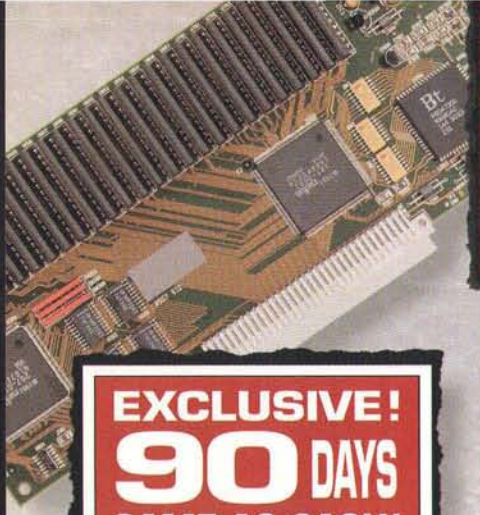

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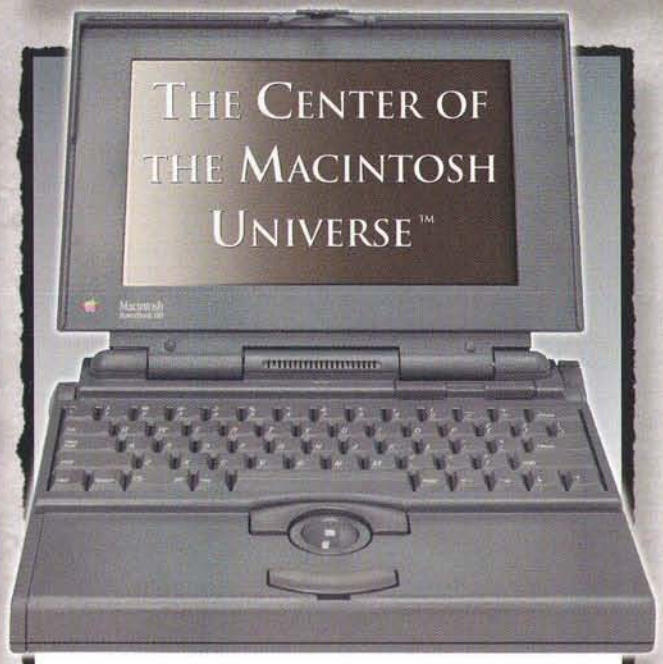

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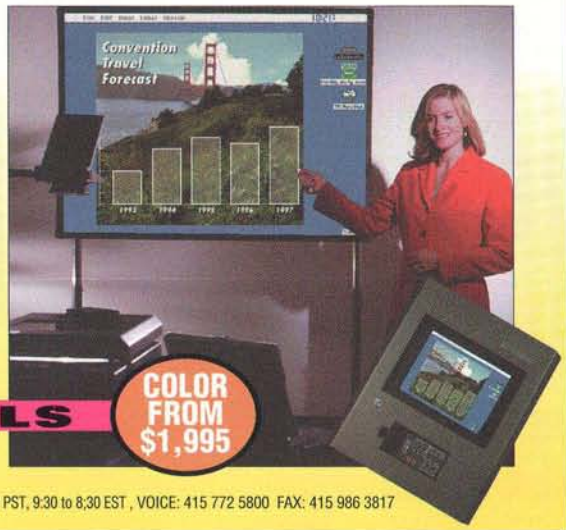

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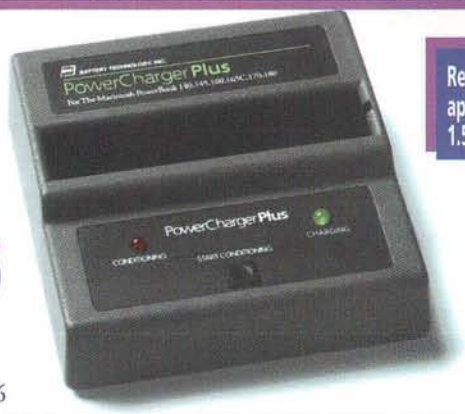

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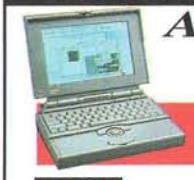

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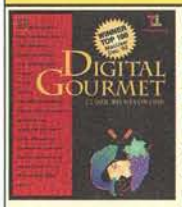

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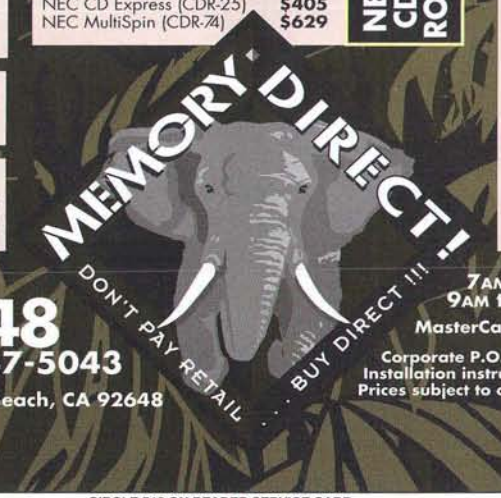

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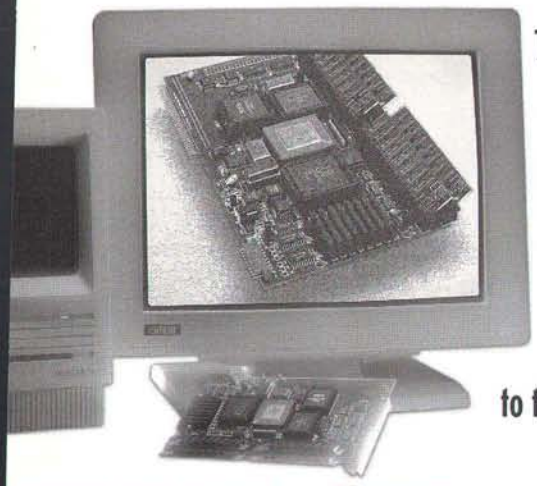

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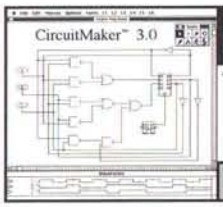

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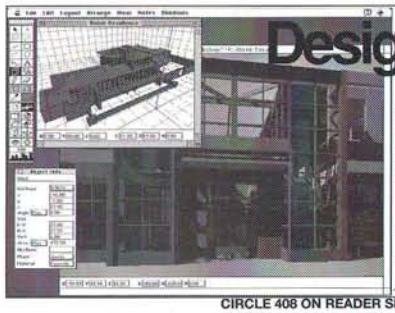

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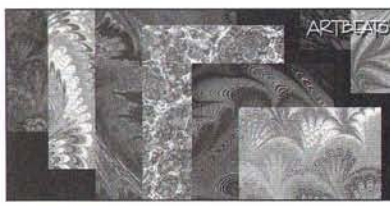

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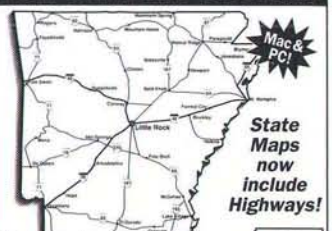

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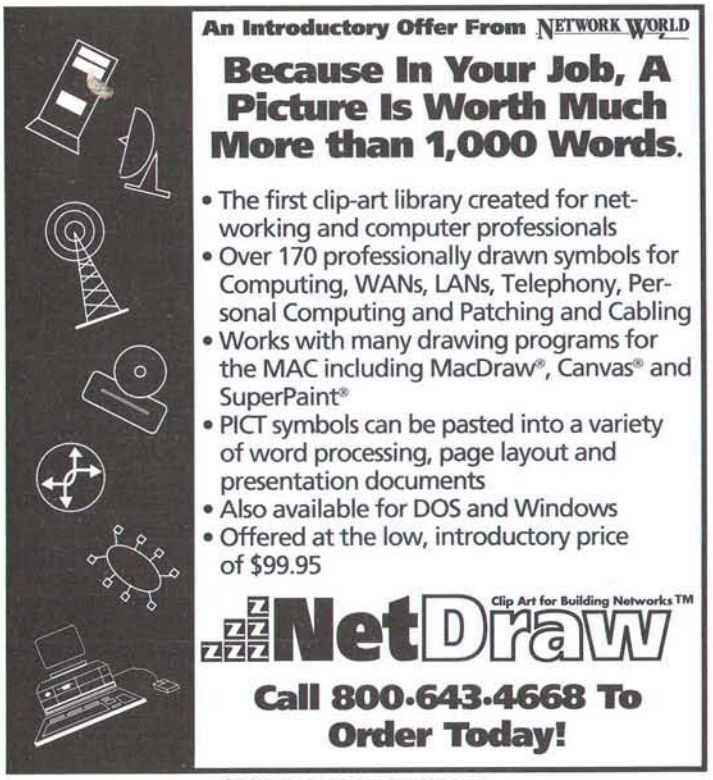

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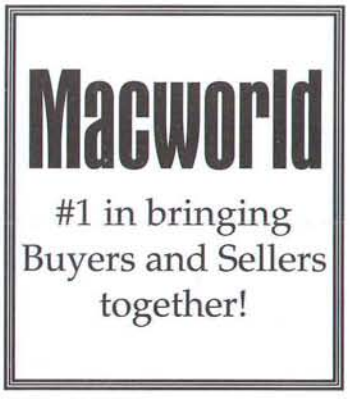

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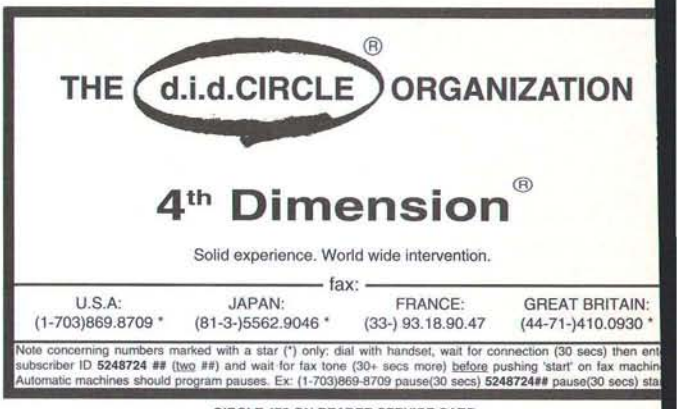

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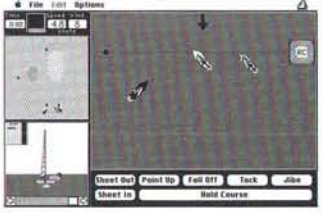

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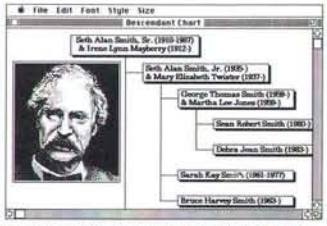

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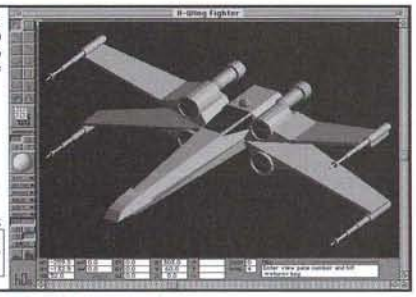

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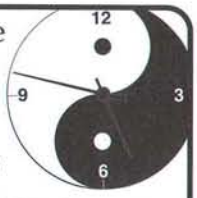

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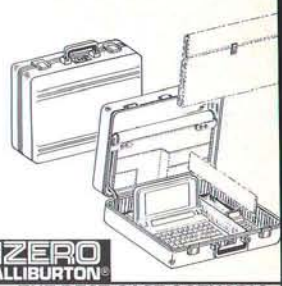

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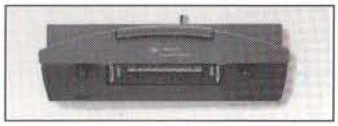

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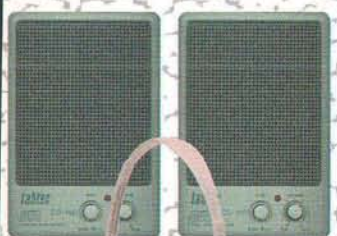

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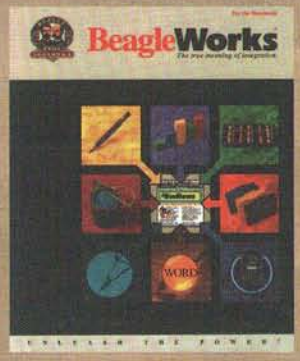

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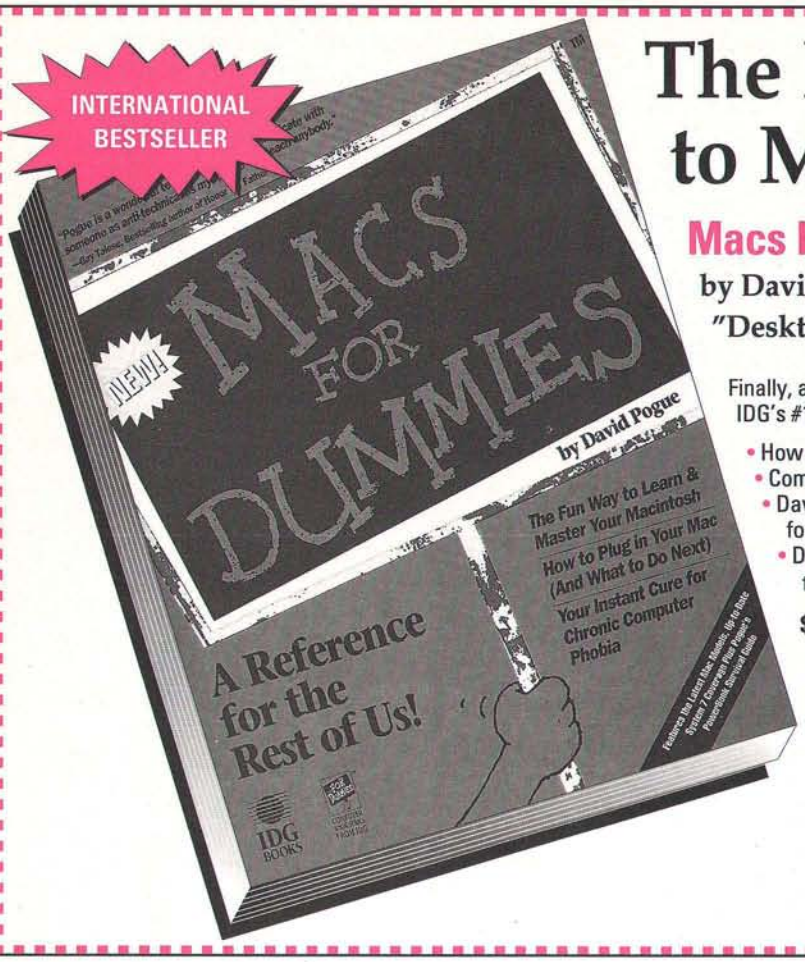

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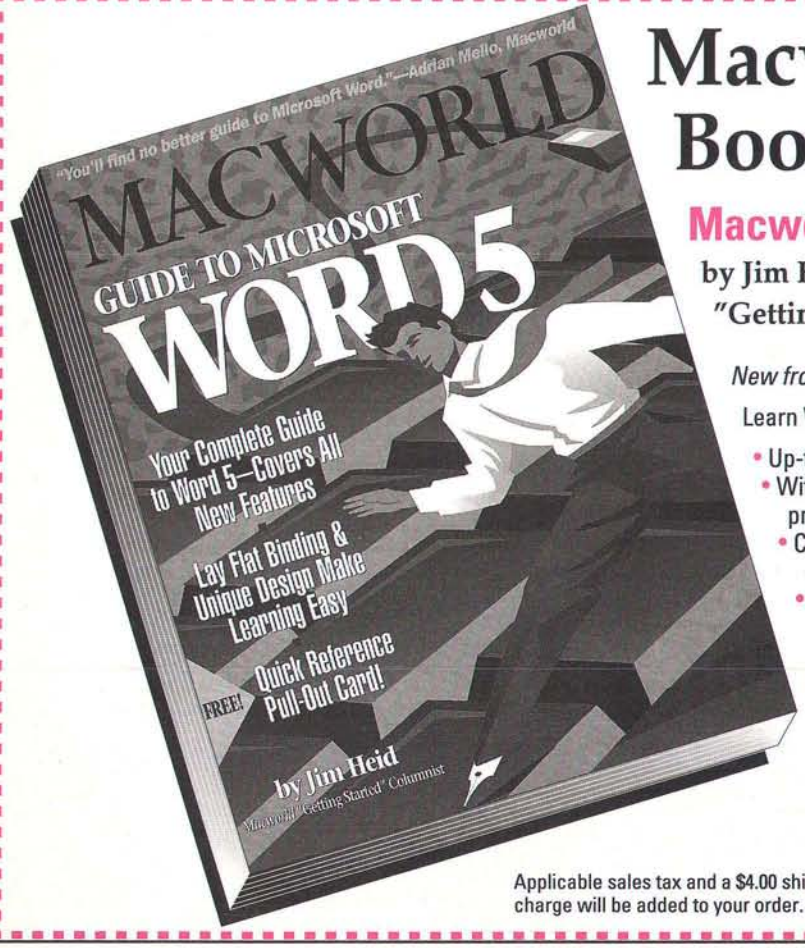

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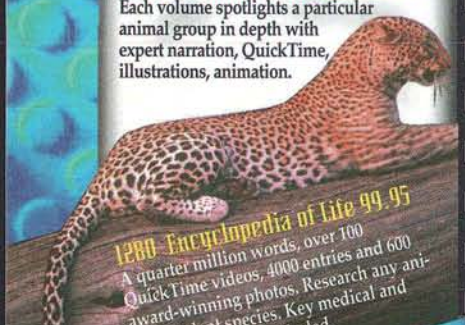

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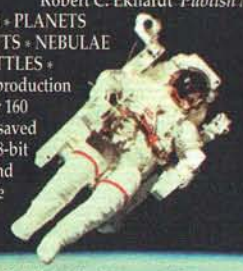

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WISE GUY

BY GUY KAWASAKI

Words of Wisdom

Guy's advice for the new Apple CEO

SINCE JOHN SCULLEY'S RESIGNation as CEO of Apple Computer, Mike Spindler now runs Apple on a day-to-day basis. Just as when a new administration takes over in Washington, everybody's got two cents' worth. Here's mine.

Dear Mike:

You did it: you outlasted the American (Steve Jobs), the Frenchman (Jean-Louis Gassée), and the iceman (John Sculley). Now there's good news (you get to run Apple) and there's bad news (you get to run Apple).

If you think Bill Clinton had a tough first 100 days, you ain't seen nothing yet. Macintosh owners may not care if you hire people who haven't paid Social Security taxes, but there are a lot of things to fix at Apple. Here is where I'd start.

Tell Wall Street to take a flying Fahrvergnügen. Hold a press conference and say to Wall Street, "I'm just a German immigrant. I don't really understand how Wall Street works, but I do know how to make our customers happy. We're going to do what's right for our customers." The share price will be in the toilet for a year, but it's already on the seat anyway.

Reduce the number of models of Macintosh. There's nothing wrong with a lot of Macintosh models except that your dealers can't explain which one to buy, and your factory can't build them. Otherwise, it's OK.

Spin off Claris. Bill Campbell and his merry band of robbing hoods upset you and John with their talk of creating Windows software and lining their pockets with cash from initial public offerings, so you reined them in. But Claris is going to die inside Apple because a software company cannot survive inside a hardware company. At the end of the quarter, what are you going to ship? A Quadra or a copy of MacWrite Pro?

Spin Claris out. Stop competing with your software developers. Get Claris an entrepreneurial management team instead of Sculley flunkies. Let it become the free-wheeling, kick-butt software company that will prevent (or more likely, *delay*) total domination by Microsoft.

Kill Macintosh software application projects inside Apple. I heard Apple is working on a PowerBook utilities package with me-too functionality such as battery conservation.* Was I dreaming? It's bad enough that Claris has a me-too PowerBook utilities package, but now Apple is doing one too? Why? Is this a strategic area that Apple feels it must control to safeguard its market position in the nineties?

My guess is that one day when the executive staff was dozing, a product manager who didn't have anything to do this summer (or until sabbatical) proposed the utilities package. He or she justified it by saying, "Like Microsoft, we can get higher margins by doing software." The exec staff woke up just as the product manager was saying "higher

margins" and approved the project.

Now there's probably one product manager, one area associate, three programmers, five testers, two writers, and three marketing consultants working on it. You'll get higher margins, but the total revenue of this package won't pay for the people assigned to it. If you've got product managers who want to do software, tell them to go work for Claris. Or even better, have them quit Apple and work for a *real* software company.

Burn the deadwood. Machiavellian as this may seem, you've got a 90-day window when you can do almost anything, so now's the time to get rid of the employees who have been doing little except cashing paychecks and complaining that Apple hasn't given them interesting jobs.

Do yourself a favor: Identify the employees who have been at Apple for more than five years and who have held more than three positions in the last two years. These may be professional job hoppers, who have no passion for their work—they're just killing time at Apple's expense.

Wrongful-termination suits will cost Apple millions of dollars, but this cost pales compared with the money wasted on special programs created to keep the deadwood busy, and with the lowered morale of truly motivated employees.

Build a computer that will kill Macintosh. Do it to yourself before someone does it to you! Everything I hear about PowerPC—such as running Macintosh software three to four times faster—is terrific. This is what scares me—I don't want a better, faster Macintosh. I want a computer that will make me *throw away* my Macintoshes.

Why constrict yourself to designing a computer that runs Macintosh software? Your competition wouldn't place this design constraint on itself. Build the best computer you can, evangelize the hell out of it, wait for two years for great software, kick Microsoft's butt, and sue Microsoft the *first time* it copies you.

Make new employees read *The Macintosh Way*. Trust me—I honestly, truly, and humbly believe that reading my book will enable new employees to understand what they are supposed to achieve at Apple. Heck, for the number of employees you're hiring these days, I'd *give* you copies.

Do these things and shave your head, and soon Gatorade will be running ads about you that say, "I want to be like Mike." ■

GUY KAWASAKI's views are his own and only sporadically represent those of *Macworld*. His latest book is *The Computer Curmudgeon*. (Hayden Books, 1992). He has investments in Objective Software, Global Village Communication, Bookmaker Corporation, Bit Juggler, and others.

* I used to be involved with a PowerBook utilities package called GUM (Guy's Utilities for Macintosh), which was published by After Hours Software. After Hours sold the product, though, so I really and truly don't have any conflict of interest here.

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All day Every DAY

The new NEC MultiSync FG "e" monitors.

Easy on your eyes, perfect for your Mac.

Pardon us, but would you mind if we sat right here on your desk, a mere two feet away from you, for the next few thousand hours?

We wouldn't ask unless we were absolutely sure you'd be impressed with our new MultiSync® FGe™ monitors.

The image you deserve.

Whether you choose a 15" 3FGe, 4FGe or a 17" 5FGe*, you'll get sharp, clear images. Not to mention colors that are so bright and so brilliant you won't be able to take your eyes off them. As well as higher refresh rates for a steadier picture.

What's more, NEC's new MultiSync FGe monitors were designed to work with current Mac® systems** and comply with strict MPR II emissions guidelines.

Every Mac should have one.

Now you've got a monitor you can live with. (Maybe even love.) Plus, the added benefit of multiple frequency technology. The technology that lets you access all the display modes now being built into your Mac, so you can choose how you want to view your applications. And do things you never thought possible with your Macintosh.

So call 1-800-NEC-INFO now. Or for details via fax, call NEC FastFacts™, 1-800-366-0476, and request catalogue 6.

Thank you for inviting us onto your desktop.

Because ⬆ is the way you want to go.

NEC

*15" and 17" CRTs yield 13.8" and 15.6" active display areas. **Cable adapter required for connection. Request FastFacts document 100100 for listing.

Circle 16 on reader service card

But it'll be okay.

In our new FGe series, the "e" is for ergonomics. And economics. They're easy to use, easy to live with–the way NEC monitors have always been. They're also easier to afford.

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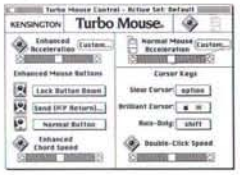
Introducing a slower slow. And a faster fas

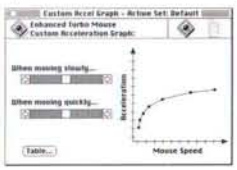
Want to zoom your cursor across your big screen monitor? Want to slow it down for small and detailed movements?



Now you can move your cursor slower and faster using one convenient setting. And you can fine-tune that setting to exactly match the way you work.

Customized Acceleration lets you do it all. And only Turbo Mouse 4.0 from Kensington has it.

Want to slow your cursor down even more? Just activate the Slow Cursor command and your cursor will literally crawl across the screen.



And here's something else only Kensington has — Brilliant Cursor.™ With it, you can actually jump your cursor from one programmed HotSpot on your screen to another. A real plus for large screen and multiple monitor setups.

What's more, Turbo Mouse 4.0 features programmable mouse buttons, two ADB ports for chaining, System 7 compatibility and a unique onscreen help system.

All of which led Macworld to say, "If you're shopping for a trackball, Turbo Mouse 4.0 deserves first consideration."

For more information, call 800-535-4242. For information by fax, press 82 and request document 323. Outside the US, call 415-572-2700.

5 years

Turbo Mouse 4.0

KENSINGTON®

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